

**WILDLIFE CONSERVATION, ZOOS AND
ANIMAL PROTECTION**

- A STRATEGIC ANALYSIS -

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EDITOR**

**A workshop held at the White Oak Conservation Center
Yulee, Florida**

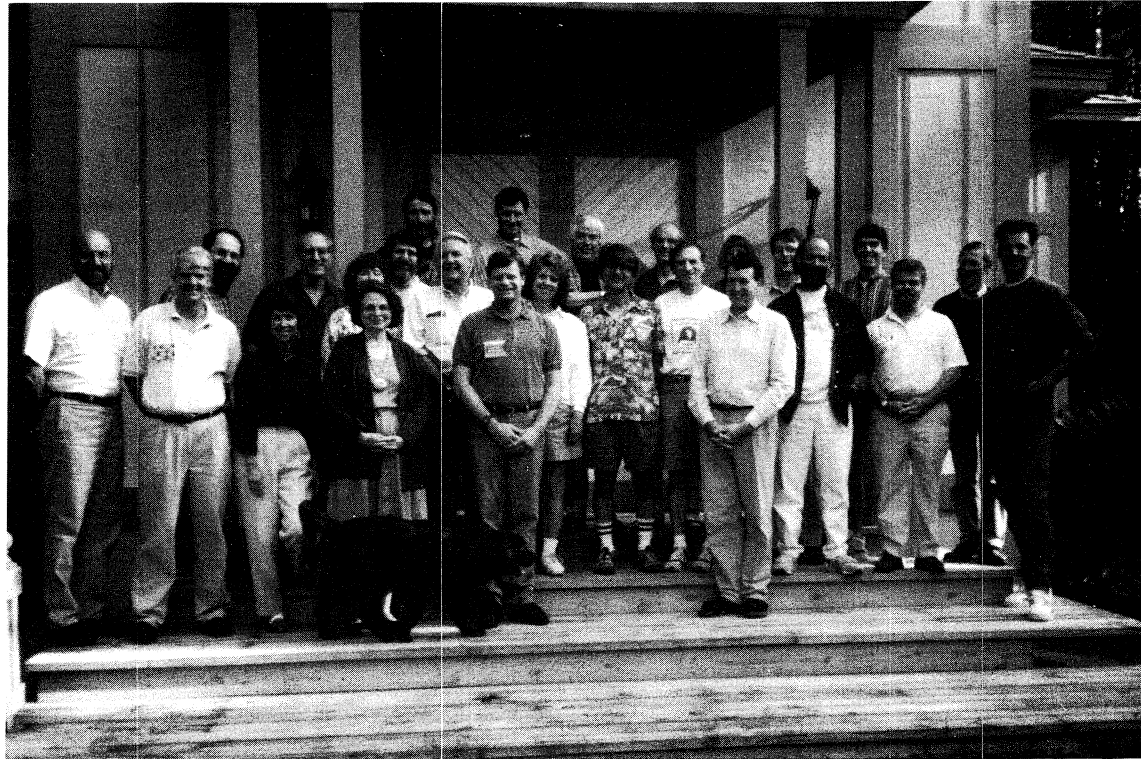
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April 21-24, 1994

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PREFACE

*Andrew Rowan, Director
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This publication is the result of several different but related initiatives that have been combined to produce a single book which will, we hope, advance our understanding of the debate about animal protection and conservation within zoos and captive wildlife programs.

The publication consists of the proceedings of a workshop, sponsored by the Gilman Foundation, and held in April of 1994 at the White Oak Conservation Center in Florida. About thirty participants were invited from zoos, animal protection groups and academic institutions to discuss concepts such as wild, captive and tame; animal well-being in the wild and in zoos; and protecting individuals versus conserving populations. In order to maximize the time engaged in discussion, several individuals were identified to prepare target articles which were distributed to all participants before the meeting. These articles form the main chapters in this book. Other participants were asked to lead off the discussion of each target article during the workshop. These comments make up the first part of the discussion following each article. The remainder of the discussion is an edited version of the audiotaped workshop.

At the end of the second day, the participants at the workshop agreed to complete a short survey that assessed their attitudes to various captive and wild animal management options. The survey was developed by Andrew Rowan with the assistance of Jennifer Lewis and John Robinson. The actual survey and the results are reproduced at the end of the workshop proceedings.

We have also included two appendices. The first, by Jennifer Lewis, was commissioned by the Tufts Center for Animals and Public Policy to examine animal protection criticism of zoos and aquaria, to evaluate the response of zoos and aquaria to such external as well as internal criticism, and to draw up a list of recommendations for possible future action on captive animal and conservation issues. Originally, the Tufts Center for Animals and Public Policy had planned to organize a set of smaller scale discussions between zoo and animal protection officials. However, for a variety of reasons, we determined that such small group discussions would probably not be constructive so we chose to promote

further discussion by inserting our own analysis of the strengths and weaknesses of the arguments of both parties into the debate.

Finally, we included a short commentary by John Robinson, one of the participants at the White Oak workshop, as the final appendix.

In sum, this project has led us to conclude that the differences between zoo and animal protection workers are relatively small and do not justify the level of public disharmony between the two sides. The leading organizations in both camps are concerned both with providing appropriate care for individual animals as well as the conservation of wild populations. The most significant difference was the level of trust in human management. The zoo professionals accepted the necessity of human management whereas the animal protection contingent was more suspicious of the beneficial effects of human agency in wildlife conservation. There are also issues about the relative importance of education, conservation and public entertainment in captive programs and about initiatives to deal with the many substandard captive animal programs in the United States.

Many issues, not least the problem of mutual trust, must be addressed if zoos and animal protection organizations are to develop a constructive working relationship. Animal conservation and protection would benefit if they did.

OPENING REMARKS

*James Smith, Director
The Gilman Foundation*

The Gilman Foundation has been in existence as a legal entity since 1981, but has been operating with a professional staff for only two years. We are a young foundation that is just beginning to define its program and to create a relationship with the White Oak Conservation Center. The Foundation and the Conservation Center are parallel entities converging on tracks that will hopefully allow the trains to merge rather than collide.

This sort of conference is very important for both the Foundation and the Conservation Center, for it goes to the heart of what we are trying to do in New York; to bring together people who can help both organizations reflect upon some of the larger world that pertain to this very significant program.

This is the seventh meeting in which we have surveyed the intellectual landscape while considering the future of our program. Such functions also serve as a way to meet other individuals involved with similar issues. Our goal is to plan future endeavors to alert us to conference prospects and research projects as well as to test our physical facilities and our capacity to organize in the real world.

We are very pleased that these physical facilities and setting allow us to bring together people of very different backgrounds in the hopes of finding common ground, rethinking preconceptions and exchanging ideas in informal ways. Over the past two years these meetings have brought together the environmental ministers of fourteen of the fifteen former Soviet Republics and seven other European countries in order to discuss environmental cooperation. We brought together people with very different perspectives on the protection of tropical rain forests and found some modest common ground, and have generated discussion concerning the international HIV/AIDS epidemic in a long-term project of which we are very pleased to be a part.

As one walks the halls of this facility representative posters and photographs can be observed, parts of our cultural program. This cultural program in conjunction with conservation are two arms of our Foun-

dition in New York, the other being conservation, arms which we feel are intertwined. We are very concerned with cultural issues and the conservation of cultural institutions and hope that this conference will provide us with some welcome advice on the conceptualization of this linkage.

WHAT DO "WILD" AND "CAPTIVE" MEAN FOR LARGE UNGULATES AND CARNIVORES NOW AND INTO THE TWENTY-FIRST CENTURY?

Michael Hutchins

Director of Conservation and Science
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The terms "wild" and "captive" have stimulated considerable debate among academicians, animal protectionists and conservationists. Some argue that animals have a right to freedom and that there is a "moral predisposition" against holding them in zoos (Jamieson, 1985; 1995; Varner and Monroe, 1991). Others argue that modern zoos and their living collections are becoming increasingly important to wildlife conservation and science, and that the collective benefits so derived may override this predisposition (Hutchins and Wemmer, 1991; Conway, 1995; Hutchins et al, 1995; Norton, 1995). The purpose of this paper is to explore the concepts of "wild" and "captive" and their meaning for large ungulates and carnivores today and into the twenty-first century. However, it might first be useful to examine these terms and their definitions. Webster's New Collegiate Dictionary (1977) defines "wild" as: "a free or natural state of existence"; "not tame or domesticated"; or "loose from restraint or regulation." In contrast, "captive" is defined as: "taken and held as if a prisoner"; "kept within bounds"; or "held or controlled by another." From a human perspective, the connotations associated with each of these terms are powerful and undoubtedly affect our perceptions when applied to non-human animals. Debates between pro- and anti-zoo advocates are likely to continue. However, as I explain here, the distinction between the terms "captive" and "wild" is becoming increasingly blurred. The lives of zoo-held animals are managed by human caretakers, sometimes intensively. Never-the-less, newer zoo exhibits are relatively large and, with the exception of predators, parasites, and diseases, often replicate many critical aspects of an animal's natural environment (Swain, 1989; Tarpay, 1994; Maple et. al. 1995). At the same time, so-called "wild" animals are increasingly impacted by the activities of humans, thus often necessitating active management of their habitats and populations (Youngusband and Myers, 1986; Diamond, 1992; Hutchins and Fascione, 1993; Conway 1995).

ANIMAL WELFARE AND CONSERVATION REALITIES

In an ideal world, wild animals would have the freedom to live (and die) as they have for countless generations. The adaptations of animals have evolved in response to various environmental pressures and it is reasonable to assume that the best place for wild animals is in their natural habitat. However, this is not an ideal world and the activities of humans are rapidly pushing many species to the brink of extinction (Ehrlich and Ehrlich, 1981; Wilson, 1992; Conway, 1995). Thus, before considering the relative merits of captivity versus “the wild” and the philosophical viewpoints of animal welfare/rights advocates and conservationists, it is important to understand the many complex issues involved in modern wildlife conservation. An example is provided by the Javan rhino in Ujung Kulon National Park on the island of Java in Indonesia (Rusuli, 1991). Located on the western tip of the island, this isolated emerald peninsula is a grim reminder of the many challenges facing wildlife today. The fact that Ujung Kulon exists at all is remarkable. The island of Java is one of the most densely populated on earth, with more than 90 million people packed into an area roughly equivalent in size to New York state. The need to grow enough food to support this mass of humanity led the local people to convert over 99% of the island’s forests into farmland. As its forest habitat receded, so did populations of the rhino, and it is estimated that less than 65 survive on Java today—all in Ujung Kulon (Sadjudin, 1992).

Recognizing the importance of this unique species and habitat, the Indonesian government declared Ujung Kulon a national park in 1980 (MacKinnon, 1991). However, the creation of a protected area, in itself, is generally not enough to ensure the long-term existence of wildlife or the habitats on which they depend. Despite the best efforts of the Indonesian government, rhino poaching still occurs in the park (Tilson, pers. comm.). In Asia, rhino horn is prized for its presumed medicinal value, and for local people, the economic incentive to kill rhinos is great (Cohn, 1988). Simply put, to many a rhino is worth more dead than it is alive. When one also considers that park boundaries are not well marked or adequately patrolled, that nearby villages have exploding birth rates, and that the local people live in poverty, it is clearly a recipe for disaster (Lant and Rusuli, 1991). Obviously, many social and economic factors are working against the Javan rhino, but conservationists must also contend with biological reali-

ties. The fact that the rhino population is so small and isolated is a major cause for concern (Macquire et al., 1987; Sadjudin, 1992). Before humans fragmented their habitat, the animals lived in a larger, more continuous population. When a particular area became over-populated, competition forced individuals to move to other areas, thus ensuring frequent genetic interchange. However, when animal populations become small and isolated, as occurs in fragmented habitats, there is a greater chance that inbreeding and genetic drift will occur. The subsequent loss of genetic diversity can have devastating effects on both individuals and populations, eventually leading to extinction (Soulé, 1987).

The relatively small size of the park (39,000 hectares) may also prevent the rhino population from expanding (Macquire et al., 1987). The number of animals that an area can support, also known as its "carrying capacity", is dependent on many factors, including the amount of space and food available. Their small population size also makes the animals more vulnerable to a variety of catastrophic events, both natural or human-caused (Ewens et al., 1987). A disease epidemic could wipe out the entire population in the course of a few months, as could a major fire.

All this leads to one inescapable conclusion: the Javan rhino is in serious trouble and without human intervention the probability of extinction is high. Unfortunately, this case is not unique; similar scenarios are being played out in a thousand parks and reserves around the world and with scores of different species of large ungulates and carnivores (Groombridge, 1993). One critical realization is that there are very few habitats left that are unaffected by humans. In short, there is no "wild", at least not in the classical sense, and some conservationists, have argued that unprecedented levels of human intervention will be necessary if many species are to persist (Duffy and Watt, 1971; Temple, 1977; Younghusband and Myers, 1986; Hutchins and Fascione, 1993). Intervention will take many forms, including: mediating conflicts between humans and animals, controlling indigenous animal populations, translocating animals or their genes to maintain genetic diversity in fragmented populations, controlling disease, manipulating or restoring habitats, and when necessary and appropriate, captive breeding for reintroduction. I will consider each of these in turn:

MEDIATING CONFLICTS BETWEEN ANIMALS AND HUMANS

Shrinking wildlife habitats, poor land use practices and growing human populations have led to an increase in direct and indirect conflicts between humans and wildlife (Newark et al, 1994). For example, conservationists face this type of challenge in their attempts to preserve the endangered Bengal tiger, Asiatic lion and African and Asian elephants (Sukumar, 1991; Saberwal et al., 1994; Parker and Graham, 1989). India is one of the world's most populated countries, and encounters between large carnivores and people occur frequently in areas surrounding national parks and equivalent reserves (Ward, 1994). Tigers and lions do not generally pose much danger to humans when their habitats remain intact and the animals have sufficient food to eat. However, if populations of these large cats become too large or prey populations drop, they may leave park boundaries and come into contact with humans (McDougal, 1991; Sabrwal et al., 1994). Near the Gir Forest in India where the world's last remaining population of 300 Asiatic lions exists, there were about 150 maulings from 1988-1992, some of which resulted in deaths (Ward, 1992). Similarly, there have been problems with "man-eating" tigers in the Sundarbans Delta on the India-Bangladesh border. Over 600 people were killed in a 10-year period from 1975-1985 (MacDougal, 1991). In an attempt to mediate this situation, park managers in the Sunderbans devised wooden effigies of human figures which are inoculated with human scent. The figures are then wrapped in electrified wire and placed along the paths that tigers travel; when a cat attacks the figure, it receives a severe shock. Park managers are hopeful that this and other innovative techniques will provide an effective deterrent (Jackson, 1991).

Besides presenting an imminent danger to humans, wildlife can also compete with, prey on or transmit diseases to domestic animals, and destroy agricultural crops. Attempts to mediate such conflicts are an important aspect of wildlife conservation, because if the conflicts persist, it is the animals that typically lose (Parker and Graham, 1989). For example, populations of large herbivores, such as African elephants, can do extensive damage to crops when they leave the confines of national parks or equivalent reserves (Thouless, 1994). As a result, many parks, such as Kruger National Park in South Africa, have erected fences to keep wildlife and humans apart (Ricciuti, 1993). Fences also have the added advantage of keeping the animals

inside the park where they can be protected by rangers.

MAINTAINING THE BALANCE OF NATURE: CONTROLLING ANIMAL POPULATIONS

When ecosystems become altered, it often becomes impossible for predators and prey to maintain their dynamic equilibrium. In the absence of large predators or the opportunity for normal migratory movements, populations of antelope, deer, elephants and other large herbivores can spiral out of control (Caughley, 1981). The ecological effects of such population "eruptions" can be devastating and are a growing problem for conservation biologists (Garrott et al., 1993). Overgrazing and trampling can cause extensive damage to vegetation, as well as permanently alter an entire ecosystem. Small or closed systems that occur as a result of fencing or habitat fragmentation are especially vulnerable to these destabilizing effects. Fenced reserves, no matter how large, are essentially "mega-zoos" which will require intensive management in order to sustain the wildlife contained within. In these restricted environments, populations of large herbivores must be constantly monitored and controlled, either through culling, translocation, or contraception (Younghusband and Myers, 1986; Diamond, 1992; Hutchins and Wemmer, 1987). Culling of elephants is a common practice in some African national parks and, although regrettable, is an absolute necessity if the delicate balance of nature is to be maintained (Pienaar, 1969). With their movements now restricted by park boundaries, these large herbivores overgraze the vegetation and, by destroying trees, convert woodland habitats into grasslands or semi-deserts (Swanepoel, 1993). If allowed to become overpopulated, large ungulates can eventually alter their habitat to the point that it becomes uninhabitable for many species, including their own (Novellie et al., 1991). One consequence of overpopulation and habitat degradation is often slow and painful death by starvation (Ricuitti, 1993).

MAINTAINING GENETIC DIVERSITY

Inbreeding, or the mating of close relatives, results in a rapid loss of genetic variability. This factor alone can lead to population extinctions (Soulé, 1987). On an individual level, highly inbred animals tend to be more susceptible to disease or have higher rates of infant mortality (Ralls and Ballou, 1982). On a population level, inbreeding and

the consequent loss of genetic diversity can also have devastating long-term effects on the gene pool. Genetic variability is the raw material on which natural selection occurs, and when a gene pool becomes diluted, populations can lose their ability to adapt to changing environments (Soulé, 1987).

When a population becomes too small and isolated to maintain genetic diversity, then animals may have to be moved to introduce new variation. The need for translocations (of individuals or their genetic material) will increase as wildlife habitats become more fragmented, thus preventing normal migratory movements and genetic interchange from occurring (Wilcox and Murphy, 1985; Hutchins and Fascione, 1993). Recognizing this threat, biologists who design parks and reserves are giving more thought to including "wildlife corridors" so that movement between reserves, and therefore genetic interchange, can occur (Noss, 1991). In many cases, however, extensive intervention will still be necessary, especially when wildlife habitats are fenced to prevent human-animal conflicts. If animals are unable to move between populations on their own, it may be necessary to translocate them by artificial means (Hutchins and Fascione, 1993). However, the effectiveness of such techniques is often dependent on the biology and behavior of the species in question. Translocation of Asian elephants, for example, has not always been successful due to the animals' strong homing tendencies (Lahiri-Choudhury, 1993).

The need for translocations may be reduced through the development of modern biotechnology (Wildt, 1989). In the future, it may be possible to transport a male mammal's sperm or a frozen embryo rather than the whole animal. Techniques such as artificial insemination, or in vitro fertilization and embryo transfer may someday be used to introduce new genetic variation into an isolated population without having to release live animals. This would not only reduce the risk of exposing the host population to new diseases, it would also help to avoid social conflicts. While the use of frozen sperm and embryos may seem like science fiction, the techniques have been used successfully with a few endangered species, including tigers and wild cattle (Wiese and Hutchins, 1994).

CONTROLLING DISEASE

Disease is a major factor controlling wild animal populations and

has significant implications for wildlife conservation. Many evolving conservation strategies, such as translocation and reintroduction, involve the movement of animals from one location to another. When such movement occurs, there is always a risk of disease transmission (Ballou, 1993). In some cases, the susceptibility of animals to disease can be increased by the stress of relocation. The transmission of disease from wildlife to domestic animals can also be expected to affect conservation programs (Meltzer, 1993). For example, when the bison of Yellowstone National Park become overpopulated, they often invade adjacent ranches in winter. Local ranchers are fearful of these incursions because the bison carry brucellosis, a potentially fatal disease that can be transmitted to cattle (Meffe and Carroll, 1994). In an attempt to appease their neighbors, the National Park Service controls bison populations through shooting. The hunt is highly controversial, but what would be the economic and political consequences of inaction for the bison and the park?

Unfortunately, our current knowledge of wildlife diseases is poor. Much more research is needed on the etiology, diagnosis and treatment of various pathogens (Hutchins et al., 1991). When animals are moved to facilitate conservation, they will need be tested for evidence of certain diseases prior to their release (Woodford and Kock, 1991). The health of domestic animals will also need to be monitored in order to prevent the introduction of exotic diseases into indigenous wildlife populations. Knowing when or if to treat wild animals is often difficult (Rolson, 1992). In some cases, it may be better to let a naturally-occurring disease run its course. Those animals that do survive will have an immunity to the disease and are less likely to be affected in the future. However, exotic diseases are another matter. Immunologically naive animals are particularly vulnerable to new or exotic diseases to which they have not been exposed, and immediate veterinary intervention may be necessary, especially in small, isolated populations (Meltzer, 1993).

HABITAT MANIPULATION AND RESTORATION

The continued existence of wildlife is dependent on there being sufficient habitat available to provide food, shelter and other necessities of life. Unfortunately, throughout much of the world, natural habitats have been or are being altered or destroyed at an alarming rate (Erhlich and Ehrlich, 1981; Wilson, 1992). In some cases, however,

wildlife can still persist or even thrive if habitats are manipulated to enhance certain features.

A potential beneficiary of habitat manipulation is the endangered giant panda. This highly specialized carnivore subsists primarily on a diet of bamboo. About every 40 years, however, a bamboo species flowers and dies off. Under natural conditions, the animals would simply migrate in search of live bamboo or switch their preference to another bamboo species (Schaller, et al., 1985). However, habitat destruction has confined the remaining panda populations to small islands of habitat. If these patches do not contain more than one variety of bamboo, the pandas could starve during a bamboo die-off. Some conservationists have suggested that the status of bamboo stands be monitored in panda habitat, and that if only one species of bamboo exists, then other species should be planted (Reid et al., 1989).

CAPTIVE BREEDING FOR REINTRODUCTION

It has become popular among certain circles to question the value of captive breeding and reintroduction programs for endangered animals (e.g. Varner and Monroe, 1991; World Society for the Protection of Animals and Born Free Foundation, 1994). By themselves, they certainly should not be viewed as panaceas for the endangered species problem (Hutchins and Wemmer, 1991; Wiese et al., 1994; Hutchins et al., 1995). The techniques are expensive (Kleiman et al., 1991), and there are simply too many species at risk for this approach to work in all cases (Ginsberg, 1993; Hutchins et al., 1995). Does this mean that captive breeding programs should be abandoned? Absolutely not. First, it should be recognized that there are many more immediate ways that zoos and their living collections can contribute to conservation beyond captive breeding for reintroduction, including public education, scientific research, the development of relevant technologies, professional training and technology transfer, and fund raising to support in situ conservation (Hutchins and Wiese, 1991; Hutchins et al., 1995; Wiese et al., 1994; Wiese and Hutchins, 1994; Hutchins and Conway, in press). Second, when a species' population is reduced to a level where it is no longer genetically viable or demographically stable, then captive breeding for reintroduction may offer the only chance for recovery (Hutchins and Wemmer, 1991; Stuart, 1991; Hutchins et al., 1995; Wiese and Hutchins, 1994; Conway, 1995). There are several documented suc-

cesses, particularly when the reintroduction projects have been based on good science (Beck et al., 1994). Two of the best known examples involving large ungulates and carnivores are the Arabian oryx and red wolf. Populations of the oryx and wolf were severely reduced due to over-hunting and both species eventually became extinct in the wild. Fortunately, successful captive breeding programs by zoos have made it possible to reestablish these animals in nature (Stanley-Price, 1989; Smith, 1990).

Recognizing the necessity of captive breeding programs in carefully selected cases should not lessen our resolve (or take precedence over our efforts) to preserve as many large tracts of existing natural habitat as possible. There is no reason that both cannot be done simultaneously (Hutchins and Wemmer, 1991).

SUMMARY AND CONCLUSIONS

In this essay, I have argued that human intervention will be necessary in order to preserve viable populations of large ungulates and carnivores now and into the twenty-first century. This is especially true in areas where wildlife habitats or populations have become smaller or fragmented as a result of human activities. Some decisions, such as culling or the capture of wild animals to create captive populations, will be controversial. In fact, I am uneasy about the prospect of manipulating nature and recognize that such attempts have not always been successful. However, difficult decisions must be made if many populations, species and ecosystems are to survive (Hutchins and Wemmer, 1987). Those that accuse wildlife conservationists of "playing God" must realize that this is the only responsible course of action; in the absence of divine intervention, it is up to us to find solutions. Because our knowledge of organisms and ecosystems is imperfect, there is no doubt that we will make mistakes. Such decisions may profit from the evolving science of risk analysis and management (Morgan, 1993).

If "free-ranging" animal populations must be managed intensively, then can we still call them "wild"? Perhaps not, although there are clearly different levels of human impact and intervention. In fact, British journalist Colin Willock predicted this situation over 30 years ago. After travelling through many of Uganda's national parks, he wrote: "I'm afraid that I believe that it is inevitable that the world's last

great collections of large animals will end up inside the isolated, defended islands we call parks or reserves. Outside such places there is not going to be much left. The areas of these parks may be vast, but this doesn't alter the fact that national parks are really just enormous zoos" (Willcock, 1964).

There are those who still hold onto the myth of wild Africa, Asia, and South America. Consequently, some individuals also believe that the best way to preserve wildlife is to simply "leave it alone" (Regan, 1983; Willers, 1992). However, I believe that this perception is based largely on the mistaken impression that there still is a "wild" out there, and I further stress that we must have "conservation without illusion" (Adams and McShane, 1992). Indeed, the decision to do nothing is a choice that also has many consequences. Given the realities under which conservation must occur now and into the future, to stand by and do nothing would be irresponsible. A policy of "benign neglect" can only lead to more extinctions (Soulé et al., 1979).

Certainly there is enough information from national parks in the United States to suggest that the long-term effects of habitat fragmentation are real and that in the absence of management intervention, many species will disappear (Conway, 1995; Diamond, 1992). A 1987 survey indicated that 14 national parks in western North America had, since their establishment, lost a total of 42 species of mammals from within their respective boundaries. Even the largest of our parks are apparently not immune. For example, the three million acre Everglades-Big Cypress Swamp park complex in Florida has lost 12 species of native birds and mammals in the last 200 years, including the red wolf, monk seal and ivory-billed woodpecker. The endangered Florida panther, wood stork, and many other species may not be far behind. I also disagree with those who argue that we can save species simply by preserving their habitats (e.g., Winckler, 1992). The preservation of wildlife habitat is essential for conservation and there certainly is need for more integrated conservation strategies (Scott et al., 1987). But, by itself, it will not be enough. The current threats to wildlife are simply too pervasive. For example, there is ample rhino habitat in Africa, but the animals continue to lose ground, primarily as a result of poaching (Ricciuti, 1992). If large ungulates and carnivores are to survive, then we must, develop the knowledge and technology to intervene when it becomes necessary to save individual species, to maintain the balance of nature in heavily

altered ecosystems, and to restore natural systems whenever it becomes possible.

Does our terminology need to change to fit the times? Perhaps. Given the political, economic and biological realities facing wildlife today, it might be more accurate for certain zoo-held animal populations to be called "protected," or "secure" rather than "captive." Indeed, the intent behind such programs is not to treat animals "as if they were prisoners," but rather to protect and preserve some representatives of their species (and their genetic material) from an increasingly hostile world and to utilize such populations and materials in the service of wildlife and ecosystem conservation. Environmental philosopher, Bryan Norton, recently argued that "it is mainly the context, not the content, of our interactions with animals that determines our moral obligations to them" (Norton, 1995). Consequently, he views captive wild animals as "animal altruists," helping to perpetuate their species and natural habitats. One problem with wildlife and ecosystem conservation is that success cannot be measured in brief time intervals. We may not know for a hundred years or more whether or not we have been successful. In the meantime, it is important to recognize that we must try. Debates over the rights of individual animals versus populations, species or ecosystems, and over the relative merits of captivity versus the wild will become purely academic if we do not find ways to slow down and eventually stop the growing loss of biological diversity.

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HUTCHINS - DISCUSSION

Clifton: There are two different approaches you can take to intervention, one of which is the North American model of active intervention which creates an economic constituency. An alternative approach is a form of management which includes such things as changing a particular crop or reintroducing a plant species that will have a particular desired effect. For example, it was recently discovered that Queen Anne's lace is a very powerful contraceptive in rodents. If you want to control the wild rodent population, you provide lots of Queen Anne's lace. There is no need for poisons or the introduction of a predator that doesn't naturally belong in the habitat.

Robinson: This discussion introduces the problem of specificity. In which cases is management necessary? I am not going to argue that we don't need management, for I believe we do. Another issue we need to consider is the concept of "wild" versus "tame." I think it is clear that there are and have always been human influences in the wilderness, that no captive management situation is totally controlled. However, I do not think habitat degradation is necessarily an argument for the lack of distinction between wilderness and captivity. For example, a forest can be degraded, and indeed ultimately converted into a field, but that does not mean that the forest, not even if badly degraded does not exist. It is worthwhile to try to maintain some concept of wilderness and wild animals and to try to define that over the course of the next couple of days.

Hutchins: I totally agree. I was not meaning to imply that we should degrade our concept of what we call the "wild." I was implying that this is a continuum and we are managing animals in the wild, we are regulating their movements, feeding and watering them, etc. It is a controlled situation in many cases. I think there is a difference between a zoo and a national park, and certainly the latter is what we are trying to preserve. But I think this clouds the issue. The fact is that this kind of management is going to have to occur, but there are differences and degrees between what we call the "wild" and what we call "captivity."

Lewis: The "wild," if it ever really existed, may become an ideal that we work toward in every national preserve, biosphere preserve, etc. I

realized a long time ago there is no wildlife population on earth that has not been touched by humans. I would also argue, however, for the least intervention possible and for the interventions that have the least impact in any given situation. There should be some kind of standard set up by people who do this kind of work. That would be the most valuable way to go about it. There are going to be situations where serious or high-level intervention will be necessary, the gray wolf being a good example of such a situation. We ought to start with the lowest level of intervention possible, and then increase it if necessary.

Hutchins: As a general rule I think that is probably a good idea. On the other hand I would hate to see us develop strict guidelines. I think conservation strategies must be extremely flexible. The intervention techniques will vary according to the problem and as a result of the species and the biological characteristics that are involved. Flexibility is very important. If the population goes below a certain level perhaps we should think of intervening and developing captive populations. However, decisions regarding colonial species would be subject to problems. There may be one half million or a million penguins in an area, but they may be in only two or three colonies. If an oil spill hits one or two of those colonies they will be destroyed. Different situations result in different approaches.

Bekoff: It is important not to downplay the necessity of the creation of an operational position. Hutchins stated that there is no wild, yet asserted that we can maintain great genetic variability in captivity when compared to "out of nature." I question that if there is no wild, what are we preserving? Do we need to come back to the issue that there is no wild? We could be compulsive and say there has been no wild from the time humans first made their appearance, but we are, or were at one time, a part of the wildlife process. It seems that people use a scale, thinking that something is less wild when humans enter the scene. I think the point made earlier about coming up with some definition is crucial. What are we preserving? Something less wild? When do we get off that slope? One of the things I have found impressive this morning is that this conference has rekindled the idea that although these animals are in captivity they are still doing what their counterparts are doing in their natural habitats, out in the "wild".

Hutchins: Norton was actually thinking about captive animals as "wild animals in captivity," which is a separate ethical category. They

are not domesticated and that is a big difference. I ran into this issue when I was studying free-living mountain goats in a national park. Those animals had never been hunted and were habituated to humans. I continually had people ask why I was studying them in such an environment since they were tame. They are not tame. They do not take food from people. Yes, I could sit in the middle of a group of them and observe them closely, as Jane Goodall did with chimpanzees, but although they are habituated to people, these are not tame animals. They are not domesticated.

I think we are preserving the potential for future evolution, which brings us to some really interesting philosophical discussions. It makes us consider the relevance of a time scale. How long are we going to preserve these things? I have been thinking recently about the measurement of success for conservation. How do you measure the success of a conservation program, and under what time scale? One hundred years, two hundred years, one thousand years?

Pacelle : You were basically arguing that it is our duty as conservationists to intervene because the situation is so severe. You suggest a polarity, that there are some who believe in intervention and some who do not. I do not really see that as a legitimate framing of the issue. There is certainly considerable debate about the means of intervention, but I think most people accept intervention as necessary in many of these situations. It is common parlance in state fish and game agencies to say that the management of wildlife population is not simply a issue of the biological carrying capacity, but rather a question of the cultural carrying capacity. The cultural carrying capacity rarely reaches the number of animals people can tolerate and the types of behaviors in which they engage. That is really the salient question for the twenty-first century. I do not, however, think that we should look at the cultural carrying capacity in a similar manner that we look at the biological carrying capacity, which may be a type of scientific notion.

The cultural carrying capacity is something that can be raised or lowered, for example bison in Yellowstone national park are met with a sort of "hands-off" policy. The park does not engage in any culling or killing of the animals. These are free-roaming creatures, therefore boundaries are nonexistent. We have ranchers on national forests who have, in my opinion, an entirely irrational fear of the threat of Brucellosis to domestic cattle. There has never been a documented case

of Brucellous transmission between bison and cattle, and some suggest that such a transmission is impossible. Yet the political powers that be create the situation and create this notion that we have some great need to manage these animals. I think what we really need to do is educate people, to increase the cultural carrying capacity. If we cannot tolerate twenty-five hundred bison in the Yellowstone ecosystem, what are we preserving? And is it not absolutely preposterous that we talk about this sort of mismanagement of wildlife? I think that more and more of the animal protection and animal rights community accept the idea of intervention, but the intervention must be humane. We have to analyze some of these problems and not just think that animals are things for us to move around as chess pieces for frivolous or gratuitous social or economic needs.

Hutchins: I do not think economic needs are frivolous, especially in developing countries where people's livelihoods are at stake. We have a lot of food here and have certain perspectives that are based on the very easy lifestyle which we live. We think differently here than others do elsewhere. There are, perhaps, better examples than the bison where disease transmission is a reality. I tend to agree with your issue about the cultural carrying capacity, although I think the cultural carrying capacity and the biological carrying capacity are interrelated because the number of people reduce the biological carrying capacity of animals.

Bostock: I am interested in questioning the concept of "wild" that has been raised. I agree with Hutchins about the evolution of wildness; it is a very long timescale that we are never going to be here to see. There is a paradox here, for the wild is a system of managing itself. We have got to intervene when necessary, but we are intervening in order to make that intervention unnecessary. It is the same as a parent looking after a child, doing what they can in order for that child to become independent.

Clifton: I like the concept that trying to preserve a species is trying to preserve the possibility of future evolution. However, in order for evolution to take place there has to be a challenge to which a population responds. When you keep a population in an essentially advantaged situation that challenge is not there. As we develop genetic technology it is inevitable that there are going to be human conducted forms of evolution, hybridization, gene transplants, etc. We

have got to let those animals go at some point, allow them to find their own niche and establish themselves. We are almost at that that point experimentally with some introduced, genetically manipulated characteristics of plants. There has been a tremendous scientific, political and legal battle. We are talking about a handful of large species, almost all the mammals, and we are not even noticing, for instance, squirrels or park bench pigeons. Most of the species are not in any trouble and are actually finding ways to co-exist, to survive perfectly well without us. It is when we notice them that their problems begin.

Hutchins: Regarding genetic manipulation, that is not the way that many technologies are being used. They are being used to preserve genetic diversity so that natural selection can occur as animals are put back out in nature.

Clifton: If that is the way it is being done within the wildlife conservation community, what is being done in the agricultural community?

Hutchins: That is different. That is domestication. Artificial selection, one of the hallmarks of domestication, is trying to manipulate the genetic material of an animal to do something you desire. That is the exact opposite of what we are trying to do with our genetic management programs, which are intended to preserve as much variation as possible so that the potential for future evolution is preserved.

Serpell: Some of our problem in defining what is wild and what is tame rests on the level of definition for which we are searching. Regardless of genetic factors, there are certainly animals, including the sparrows in the park, which are not directly controlled by humans. To my mind that is one definition of wildlife and it is one of the definitions quoted by Hutchins from Webster's. Conversely, all captive or domestic animals, even if they are given considerable freedom, are to some extent restrained or controlled, and I think it is very important that such a dichotomy continue to exist.

One of the reasons for its importance has to do with the public perception of wildlife and the pressure that comes from the public to conserve wildlife. If we lose sight of these creatures as wild things in wild places that are not controlled, we will lose the public pressure to conserve these very things. There will no longer be pressure to preserve because the thing people want to maintain is not the tiger in the

cage, but the tiger in its wild, raw state.

Hutchins: You bring up a very important point and I agree with you one hundred percent. That is one reason why zoo philosophies are changing rapidly. The concept of wild has got to be in the public mind in order for there to be some political momentum to pressure for wild areas and wildlife. We should not be looking to preserve animals just in captivity. That is not and should not be our goal.

Norton: When it becomes reproductive control you are moving into the realms of domestication. There is a gray area there, the barrier between wild and domestic that is a permeable one. There comes a point where an animal is so controlled that it will not ever return from being a totally domesticated species and could never survive in absence of that human dimension.

Hutchins: You are mixing up the difference between “captive” and “tame,” which some consider to be quite different. Wild animals in general are not tame.

Robinson: It may be useful to speak of control of individual behavior as a characteristic of captive animals, and human control of populations or habitats as being a wild situation.

Norton: Yes. The point I’m trying to get across is that there are animals out there making decisions about their lives which are entirely independent from any human intervention. Conversely, there are animals living in a state where they may not be able to make those decisions or choices because humans have made those decisions for them. That is an important distinction.

I would like to go back to this revision of the wilderness idea in a very general sense. It seems to me that there are really two intellectual changes taking place, and I feel it is important to keep them separate. One change that has taken place deepens our understanding of human and wild animals. It is our discovery that indigenous populations interacted with their landscape and with animals for a very long time. This should have been obvious from the beginning. As we learn that those human and non-human populations have evolved together we need to correct our conception of wilderness by recognizing that historically there really was not a wilderness in the sense of total separa-

tion from humans but rather, because of low impacts and smaller numbers of people who lived in indigenous populations, there was rather a co-adaptation and a co-evolution.

The second revision taking place is incursions caused by highly technological societies, and there would be at least two important subparts to this revision. One would be, for example, acid rain, which is going to change habitats no matter how much we try to protect those areas. The second one, extremely important in third world countries, is social disruption as a result of rapid economic developments. Such developments are often very centralized, causing people to migrate into tropical forests, places they do not really want to go but have no alternatives.

As we revise the idea of wilderness and recognize that we are on a continuum we need to remember that there are two revisions going on simultaneously that are quite different. We need bring those two ideas back together again so that we are more critical of the different ways humans interact with nature. We should be looking for ways to live and co-evolve with other species, for that is the only realistic option open. This might mean putting very strong constraints on some of the things we do as a technological society.

Jamieson: One of the key issues here is what it is we are really trying to accomplish. Part of why our answers tend to be contradictory is that often in our rhetoric we suggest that certain things are necessary for the good of the animals, and in some cases that is true. But to a great extent what is at stake is our ideals of preservation. We place a very important value on preservation of species. The concept of preservation is a cite for values that conflict, that contradict each other. The problem there is that humans can be a selection constraint on evolution, so the potential for future evolution is in no way inconsistent with bioengineering or the very strong selection pressures being exercised by humans. Another thing I think a lot of us are interested in preserving is some idea of wildness, where that implies some independence of human control, and there we have a fairly direct contradiction between two things that we might think we are trying to do when we are preserving animals. Insofar as it really is true that we cannot preserve wildness, I think that the ideal of preservation becomes less urgent than it would otherwise be.

Hutchins: That is a very interesting point, although I think again that we are talking about a continuum and that makes it even more complex. There is a continuum of wildness and we want to go as far as we can along that continuum, but realities may be preventing us from reaching the ultimate end. That is where we presently find ourselves. We would like to reach the end of the continuum but the biological, political and economic realities in which conservation must occur, especially if we are going to double the human population in the next few decades, are going to put a limit on our ability to reach the end of that continuum.

Pokras: One of the questions I have concerns the establishment of guidelines for various types of conservation programs. It seems to me that many of the guidelines are soft, causing problems of scale. That is one of the problems in defining wild as well. Wild for a chickadee is very different from wild for an elephant or rattlesnake. The natural history of the species has to guide us on what it is we are looking at. Part of the problem is the eyes through which we look. When I see a Great Horned owl around South Station in Boston, it does not look wild to me. But how does it look to the owl's eyes? He is feeding on rats and nesting in abnormal places, but that is still a wild animal. I think we have a confusion between wild, what the animal feels and the wildness, which is a very different concept.

Hutchins: I agree with what you said completely and I think that a Great Horned Owl living on the edge of a building is a wild animal. I also believe that generalizations are dangerous for conservationists and that flexibility is critical. That is why I have such a difficult time with some ethical paradigms that do not allow flexibility, for I do not see how we will be able to respond to some of these issues and attempt to preserve species or ecosystems without it.

Jamieson: We have multiple ethical paradigms. One is a relatively inflexible or absolutist paradigm. The kind of ethical theory that I favor gets accused of being excessively flexible, a more consequentialist paradigm. I would argue that in this area we need to worry about not being excessively absolutist with the ideal of preservation, that sometimes in these types of discussions when we talk about what action is necessary it sounds as if we are setting up the ideal of preservation as the ultimate value to which every other consideration must be sacrificed. I think we need to be flexible about that value.

Grandy: I have a number of disparate points I'd like to make. We are using contraceptives on truly wild animals and controlling their population. I agree that this does not add true domesticity to them. The wild ponies which are having their population controlled through reversible contraception are as wild as they ever were and hopefully will continue to be so without stripping off their habitat.

Nonetheless, I want to associate myself with the concept of "wild" that Jamieson put forth in his paper. Clearly all of us understand that the decreases in habitats around the country are requiring more and more intensive kinds of hands-on management systems. We may not all feel comfortable with that, but at some level recognize the necessity for it. However, I am concerned where taking that generalization too far may lead us. Use of the least invasive kinds of technology is clearly desirable, and the corollary response to it raises some fundamental questions about where we go. The response is that we as managers want more and more flexibility. Flexibility is an open invitation to abuse unless flexibility is limited by guidelines which reflect limits, priorities and societal norms. Even White Oak raises fundamental questions. White Oak is all of the best things that the zoo environment can be, all of the best values it can have and all of the best things it can do for animals. Nonetheless, we all know that there are one thousand or more places around the world where that standard is not even considered, much less approached, so I am concerned with where too firm a grasp of this generalization of the need for intensive management takes us, as well as the permissiveness associated with it.

Finally, I want to close with something that struck me as I read Hutchins' paper regarding the timescale of what we are dealing with. There is a lot of talk about habitat destruction and what that means. Tsavo Park in Kenya has been monitored for the last thirty years. Thirty years ago everyone said the park had been destroyed, that it was an ecological desert; it had been trashed by elephants. There is now a film that shows the park coming back, regenerating itself over this thirty year time span. What I am relating to here is the timescale in which we define damage and the apparent recuperative capacities of the ecosystems and habitats that we are dealing with.

Bekoff: In regards to what Pacelle said, I'm not sure that I agree that *in vitro* contraception is more humane than any other source of intervention. I think this notion comes about because we are not able to see

something “bad” result, but we are having a major intervention on a life when we change its reproductive habit.

There is also the importance of understanding evolution. We tend to throw the word evolution or selection around very loosely. I find Hutchins’ point of looking backward for understanding of evolution a dangerous practice. The environments in which many animals evolved were very different than they are today. We may get some information about their evolution but I am not sure how much that is going to help us in understanding the sorts of habitats we need to provide for the animals so that they can evolve as they did in the past. No one has mentioned being concerned with the reproductive habits of the animals in regards to a time scale. How fast do they reproduce? How much genetic diversity is there in these populations? The time scale for evolution is different for each species and we need to be sensitive to these differences in reproductive habits.

I hear a lot about what we should do, how we should do it and how fast we should do it. I have not heard the question why we should do it. Is there a limit to how much biodiversity we should try to maintain? Maybe we are trying to do too much and need to concentrate our efforts in certain areas, come up with some consensus. There is a process of selection going on, and I wonder if perhaps we need to narrow our goals. We will not all agree about what species should be saved or which are “disposable,” but I wonder if in trying to do too much we are really doing nothing.

Kaufmann: In many ways what we are talking about is what “wild” and “captive” mean to us as individuals. We repeatedly talk about “we” in conservation. Who is this “we?” At the same time we are seeing an increase in population. We have become more and more aware that we have to work with indigenous populations and be politically correct. I think there are two races going on. One has to do with preserving the animals, the genetic material, the individual animal. But what must happen at the same time is that the “we” must become enlarged so that it is not seen as merely zoos or animal rights groups. The general public in our own country has a poor understanding of conservation, of animals. Honesty must also include the notion that we are doing something that we are not sure is going to work, but we are doing our best.

Hutchins: Inflexible values or philosophies do not allow us to take risks. Conservationists are going to have to take a lot of risks which will sometimes be successful and sometimes not. The problem is that if you are being constantly scrutinized or criticized you are not going to take those kinds of risks. This is a good reason for more unity within this community. If the fingerpointing and inter-agency infighting continues no one is going to take risks, a situation that does not create a good climate for learning about or doing conservation.

Lewis: Although I am representing an animal protection group and I think contraception is a viable alternative in many circumstances, it is true that it does have its impacts. All you have to do is look at the history of oral contraception in human women to understand that. If that is not being looked at, it needs to be. Zoo people have a long history of using contraceptives on captive animals and there have been some negative impacts.

In regards to timescales, I think Grandy was trying to make the point that we may be thinking in timescales that are too short in terms of survival of populations. We see elephants stripping bark off trees and deem it an emergency. I am not claiming that elephants never destroy their own habitat, but saying that our knowledge is imperfect. If Tsavo is regenerating itself then maybe we need to think in longer scales when responding to those types of issues.

I think most animal protection people who are knowledgeable about conservation and wildlife issues understand the necessity of preserving populations. Some of the misunderstandings occur when one hears a statement claiming that an individual animal may have no importance. It is hard for our hackles not to go up because we are so connected to the idea that these animals are sentient and can suffer and that it is our responsibility to treat them with the maximum respect and least intervention possible.

Hutchins: I would not disagree with that, in fact I struggle within myself with the competing interests of the individual versus the population. There are real conflicts that can occur and difficult decisions that must be made. To discount these difficult decisions is a problem. I think that they are made every day in an animal shelters when an animal is put to sleep. I think that those of us involved in conservation are often faced with the lesser of two evils.

As far as longer time scales are concerned, I agree that we have an imperfect knowledge of how these cycles occur. However I also raise the point that this issue of humaneness is interesting when talking about natural cycles and scales. In the absence of human intervention, animal populations will control themselves and they will do it through starvation, less humane than shooting if you consider the relative pain involved. We need to follow the statements of animal protectionists to their logical conclusions and see what their impacts are.

Robinson: Regarding Beckoff's question of why do we do it, I think our definition of wilderness as "the absence of control or restraint" is culturally important because it re-approximates our ideals of paradise. I think that is one of the reasons that we are grappling with that question. There is also that wonderful internal contradiction that paradise is populated by all of these tame, captive animals, the lion lies down with the lamb. There is another concept of paradise out there and maybe this discussion is really about that.

WILD/CAPTIVE AND OTHER SUSPECT DUALISMS

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INTRODUCTION

Dualisms have had a hard time in recent years. Philosophers used to think that facts and values were distinct, and that philosophy and science were radically different enterprises. While scientists employed empirical methods to discover the way the world happens to be, the job of philosophers was to use conceptual analysis to reveal how the world necessarily is. In the wake of the revolution unleashed by Quine in the early 1950s, philosophers either had to learn some science, find another job, or fight an irredentist action on behalf of conceptual analysis that is mainly of interest only to a few other philosophers (see the essays reprinted in Quine 1961; for discussion see Burge 1992).

The loss of these comfortable dualisms has upset the complacency of scientists as well as philosophers. Ethics cannot be ignored when the NIH requires ethics modules as part of all new training grants, when human and animal research must be approved by university committees, and when both the general public and “opinion leaders” feel free to comment on a wide range of issues that a generation ago might have been regarded as purely scientific.

DUALISMS AND ENVIRONMENTAL PHILOSOPHY

The attack on these dualisms had also made itself felt on various political and social movements, including the environmental movement. Classical environmentalism (CE), the dominant view of the American environmental movement of the 1960s and 1970s, seemed to suppose that there was an all or nothing distinction between clean and polluted air, that wilderness is wild nature untrammelled by humans, and that wild animals are those who live lives that are completely independent of humans. For the CEs the distinction between the natural and the human was fundamental. Beaver dams are natural but Glen Canyon is not. Nature is stable and self-regulating: change, lack of balance, and

disequilibrium are the effects of human intrusion. The ultimate goals of the environmental movement is to protect nature from human beings, and human beings from themselves.

In recent years the New Environmentalists (NEs), many of whom are scientists or economists, have denigrated CE as a naive or outmoded view. With that special wrath that siblings and sectarian Marxists reserve for their next of kin, some NEs seem to see CEs as the enemy of the environment. By holding out for confused and unrealistic goals, CEs spurn the opportunities to make a difference that are available. They demand what they cannot have and, despite their good intentions, nature is crushed between the CEs on one side and the "wise use" movement on the other.

At least three influences that have contributed to the rise of the NE:

One influence is the generalized cultural effects of Post-Modernism (PM). For better or worse PM has become the reigning intellectual perspective of our time and its influence is felt in a variety of different ways. Our current tendency to see change as constant, difference as dramatic, and categories as slipping, sliding, colliding and melting into each other is an expression of PM; so is our suspicious of ideals and our tendency to see logic and rhetoric as continuous or even the same thing. In some circles arguments and armies are evaluated on the same basis: how effective they are in changing people's behavior. PM hovers in the background of all contemporary cultural work and conditions the responses even of those who claim to have no idea of what it is (for further discussion see Jamieson 1991).

A second influence that has contributed to NE is the rise of environmental history and the new ecology. It has become common to say that the kind of wilderness envisioned by the CEs hardly ever existed anywhere at any time in which there have been human inhabitants. Stories are told about how the ecologies that we now associate with wilderness were created by aboriginal populations acting on the land in Australia, North America, and Great Britain. Not only do CEs have a false conception of wilderness, but on this view they also have an ethnocentric one (see Callicott and Guha, both reprinted in Gruen and Jamieson 1994). Their conception of wilderness could only arise in a highly developed society that is out of touch with its origins and misunderstands the way that billions of people continue to relate to their

environments. While environmental history shows us the ubiquity of human interaction with the land, the new ecology emphasizes the tumultuous and even catastrophic natural history of the Earth. The greatest extinction episodes in the history of life preceded the evolution of humans. Nature, independent of humans, is often out of balance and equilibrium.

A third influence is the tendency to see environmental risks as inevitably increasing. The problem for environmentalists is not to reduce risk, for that appears to be out of the question, but to manage and distribute risk in an acceptable way. The air will be polluted - the question is how polluted, in what respects, where, and who will suffer the costs. Most nonhuman life will take even more of a beating in the next century than it has in this century. Since we can't prevent these negative environmental changes, the challenge is how to manage them so that they will be less unacceptable than otherwise would be the case.

WILD AND CAPTIVE

One distinction that the NEs are tempted to collapse is that between wild and captive animals. The distinction is often overdrawn in the first place and will become even more blurred in the future. It has been argued that cheetahs who live in the wild passed through an evolutionary tunnel that probably had nothing to do with people. This reduced their genetic diversity to such an extent that, from the point of view of population genetics, they are similar in many respects to populations of captive animals. In the future, NEs argue, the distinction between wild and captive animals will collapse even further as parks and preserves increasingly come to resemble zoos and zoos increasingly come to resemble parks and preserves.

What will drive this pressure towards the further blurring of wild and captive animals are concerns about species survival. For many species, either bringing them into zoos or managing populations in their natural habitats are the only hopes for their survival. The very idea that these animals could be left alone with some "hands-off" management policy is regarded as a dangerous delusion. People are involved in changing global land-use patterns, destroying ozone and perhaps even changing climate. Almost no form of life is unaffected by human action (see McKibben 1989). Animals living under these new global conditions are not wild in the CE sense of the term, despite the "born-

free" mythology that is reinforced by television nature shows. Moreover management of captive animals is getting better all the time. Sometimes it is even argued that intensive management practices can preserve more of the "wild" traits of some populations than less aggressive policies. On this view freedom and captivity are no longer mutually exclusive.

THE DESCRIPTIVE AND THE NORMATIVE

The NE critique of various dualisms in environmental philosophy is not just an intellectual exercise. Various specific policy prescriptions are supposed to follow from this critique: for example, that we should aim for optimal (rather than zero) pollution; wilderness should be intensely managed; wildlife must "pay its own way." Once we see that pressure on wild populations will only increase, that extinction is the only practical alternative to intensive management and captive breeding, and that the difference between wild and captive animals is overstated anyway, then we should give up our opposition to zoos and our sentimental attachments to individuals animals and embrace high-tech, intensive management schemes directed towards preserving species. Zoos should be turned loose to bring in more animals from the wild. Captive breeding should be accelerated even if this means "euthanizing" zoos animals who are not part of such programs.

But slow down. While this story is attractive to many people its conclusions require further argument. CE need not give up their substantive views simply because some old distinctions have been called into question. Even if it is true that we are in an age in which distinctions are disappearing, nothing much normative immediately follows from this. Maybe the NEs are right, and wild and captive animals aren't different from each other as many of us might think. If so, we've learned something. But further argument is needed to show that we should act in some way or another.

DUALISMS AGAIN

It might be objected that I have reintroduced one of the dualisms that NEs would reject — the distinction between the descriptive and the normative. It is worth asking how thoroughgoing the NE critique of dualism is. In deed, some might argue that rather than rejecting dual-

isms NEs have assimilated one side of various distinctions to the other. Rather than rejecting the very distinction between wild and captive animals it could be argued that NEs want to treat all animals as captive animals. But even if that is an excessively harsh charge, the distinction between the descriptive and the normative is worth hanging on to. Excepting perhaps certain forms of supervenient naturalism, all moral theories hold that reasonable people can agree about the facts yet disagree about the values (for discussion of supervenient naturalism see Brink 1989).

However the main point I want to make is that if the NE case against dualisms is successful it should lead us to understand the distinction that the CEs make in a different way, but it should not lead us to reject these distinctions altogether. In the light of the NE critique we should view such dualisms as expressing pragmatic distinctions, perhaps useful for certain purposes but not for others, matters of degree rather than metaphysical differences of kind, in most cases with important human perceptual dimensions. No case had been made for supposing that such distinctions are unintelligible, pointless, or useless. It would be just as rash and unmotivated to give up these distinctions in the face of the NE critique as it would be to conclude that there is no distinction between the bald and the hirsute on the ground that even the bald have a little hair and even the hirsute have some bald spots (however small).

We can see how the CE dualisms can be reconstructed by considering the case of wilderness. For the sake of argument suppose that the CEs define wilderness as natural areas that are radically distinct from humans and the effects of their actions. Now let's suppose, as NEs have argued, that there are no such areas — that sometime during human history all areas have been affected by human action, that even now climate change, ozone depletion, and jet contrails are everywhere. What should we conclude from this critique?

What we should not conclude is that wilderness does not exist, and therefore we should abolish the Wilderness Act and disband the wilderness system. What we should conclude instead is that the distinction between wilderness and nonwilderness is a matter of degree. That a particular way of drawing the distinction between wilderness and nonwilderness fails does not show that there is no point in drawing such a distinction or that we fail to pick out something that is

important to use when we talk about wilderness.

Consider a case in point. In reflecting on his childhood, John Ruskin remarks that the pure childish love of nature ... in myself ... has always been quite exclusively confined to wild, that is to say, wholly natural places, and especially to scenery animated by streams, or by the sea. The sense of the freedom, spontaneous unpolluted power of nature was essential in it (Ruskin 1991:22).

Suppose that an NE points out to Ruskin that what he thought had been a "wholly natural place" had been inhabited Neolithic hunters. Does this mean that Ruskin had failed to refer when using these words, or that his experience of the "pure childish love of nature" was in some sense ungrounded, to be extinguished insofar as he is fully rational? Of course not. All that is important (holding some other factors fixed) for securing reference or grounding the experience is being able to draw a significant distinction between what is natural and what is not. This distinction need not reflect an essential difference in kind that is part of the fabric of the world. What is important for Ruskin and for us is that there is a distinction in experience or conception.

What does this mean for the distinction between the wild and captive? Even if this distinction is a matter of degree rather than kind, it can still be significant. Even if it is a human distinction that is conventional to some extent it may still properly play an important role in our moral thinking. Whatever moral force this distinction may have is not blunted by the NE critique.

THE RETURN OF THE NORMATIVE

What I have been suggesting is that the NE critique may teach us something about distinctions and how they work, but that it has no immediate implication about what our policies should be. Questions such as whether we should try to preserve areas of the Earth that are as free of human influence as possible, and if so what priority these attempts should have, nor not answered by pointing out that there are no parts of the Earth that are entirely free of the consequences of human action. Nor does it follow from the fact (if it is one) that the distinction between wild and captive animals is a fuzzy pragmatic one that we are justified in depriving some animals of freedom in order to

preserve their genetic material. Although the NE critique of CE may lead us to understand these questions in a somewhat different way, there is little reason to think that we should change our answers to them.

The winding road leads back to the moral considerations involved keeping animals in captivity. Elsewhere I have discussed these considerations in detail (in Gruen and Jamieson 1994, and in press). What I have argued is that there is a moral presumption against keeping animals in captivity, and although zoos do provide benefits in the areas of entertainment, research, education and preservation, they are not significant enough to overcome this presumption. Moreover I have argued that the idea that by keeping animals in captivity zoos can preserve wild nature is a cruel hoax. If we continue to keep animals in captivity, we should conform to the highest standards of treatment and respect; there should be no question of killing some animals in order to make room for others who would also be unjustly confined. This is the least that morality demands. These conclusions, contrary to what some may think, do not turn on any particular analysis of wild and captive. For those who want to reject these conclusions there is no substitute for doing the hard work of confronting the moral arguments that I have given.

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JAMIESON - DISCUSSION

Norton: There is much that I agree with in Jamieson's presentation, in particular the notion that there is a moral presumption in favor of keeping wild animals wild. This idea puts a premium on the type of moral soul-searching that will be necessary to justify invasive procedures. There is a great deal of disagreement about how successful captive breeding and reintroduction programs have been and will be in the future. Success, or lack of it, affects the strength and kind of moral justification necessary. The problem is clearly set: Is there a moral justification? It is not productive to relate the idea of the welfare of the species, to the concept of rights of species. The traditional conception of rights is so closely linked to individuality in the history of philosophy that the attempt to extend that concept to apply to species does not work.

It seems to me that intergenerational human obligation is really the heart of the matter and cannot be passed over or treated as unimportant. When I hear people talking about sustainability I do not see any reason to interpret sustainability as having anything to do with rights of species. That was simply an aberration in the history of environmental ethics which unfortunately has not been fully corrected. I look at these things quite anthropocentrically, but that does not mean that I have no concern about pain and discomfort and invasive changes in the lives of individual animals. I see that as a separable question from what is our bequest, and it seems that the bequest of this generation to the next should include some kind of healthy, functioning ecological system and processes, as close as possible to a full compliment of species that exists and have existed. It is necessary for us to provide moral justification for these activities, especially when they include pain or disorientation of animals. I agree with the moral presumption of wildness. Protecting the wildness of wild animals is also part of that bequest. If we pass on a totally domesticated landscape the future will be worse off in many ways, including ways that affect values. Having some kind of realistic connection to an independent, functioning, self-organizing ecological world is an essential part of human psychic and moral development.

What we need to do is get away from this notion of human interests versus animal interests, when in actuality it is human interest against

human interest. We are a generation that is in the process of creating a holocaust in the biological world. To stand by and do nothing is totally morally unacceptable. This brings us back to the point that there is significant disagreement around this table about a factual matter; does this work? Can we accomplish it? There is evidence on both sides, but I am a strong believer in adaptive management, comprised mainly of two strategies. First, set some goals and choose modest efforts that will move one towards those goals. The second strategy is to design programs in such a way that the amount of information and knowledge one gets is maximized.

So the real conflict is between generations of humans. The moral principles are principles of sustainability and obligation to future generations. Those are strong enough to overcome the obligation to keep every wild animal wild in every situation. Which of our efforts are likely to work, and which will increase our knowledge base so that future efforts are more likely to work? If we fulfill the above two conditions in the choices that we make we will have made an adequate answer to Jamieson's challenge to provide a moral justification.

Kaufmann: I noticed the idea of "new environmentalists" versus "classic environmentalists." What occurred to me is that while I might be able to find two or three authors that would fall into either category, does that create a movement? Even if there is a movement, what does that mean? Do all new environmentalists think or believe certain things? More importantly, do they all act on their beliefs?

Jamieson: First I think it should be assumed that everyone here wants to preserve nature and all of its wildness. I do not, however, see this as just a conflict between human interests. It is the welfare and well-being of individual animals that gets lost in the shuffle. I do not see this as just a factual question about what works and does not work because I think there are a lot of questions about what the "it" is that we want to work or not work. In some sense it is such a difficult speculative issue about the future that it almost becomes minorly empirical.

In terms of Hutchins' comments, these issues are deeply theoretical and philosophical. We are going out and taking action, but reflection on that action is necessary. We cannot be heads without bodies or thoughts without actions. Finally, in terms of these movements I do

think there is a new wave of thought and a new wave of thinking about environmental policy. The “old” idea is that these animals have the right to share the earth with us.

Hutchins: Although I think I agree with the moral presumption against captivity intellectually, I want to make clear that I do not think this is an animal well-being issue. It goes deeper than that. I could argue just as strongly that conditions are bad for individual animals in the wild and that there is a moral presumption not to leave them there. I think that there is a potential alternative argument there because animals in the wild are subject to disease or poaching or parasites, etc. If these conditions in the wild are really bad, I could argue that animals ought to be brought into captivity purely from a humane point of view.

There is a logical hole in your argument that because captive breeding may not have been a perfect strategy in certain cases in the past that it will not be in the future, given that programs and knowledge change. I agree that this strategy should not be sold as a panacea; it is not something that will have widespread success by itself and we ought to carefully select species for which we decide to pursue this strategy. However, there are going to be species for which this will be required. There also are many alternative uses of living collections that go well beyond captive breeding for reintroduction. These include public education, raising of money for conservation, the media attention, political action, etc. We are moving in the direction of alternative uses of living collections and to provide individual justification for those species that we manage.

Genetic and demographic management is a welfare issue as well as a conservation issue. If you are going to have captive populations and justify their use and utilize them in some beneficial way for conservation then you should manage them responsibly. That means genetic and demographic management. Without such management there is an individual cost to animals that are produced in inbred populations that could cause suffering if they are not properly managed.

Clifton: In Quebec the whole legal structure of the society proceeds from the belief that the rights of the many supersede the rights of the individual. Overseas the rights of the individual are basically nonexistent. The collective entity is what reigns supreme. We have to deal with this reality every time we go overseas to try to save a species and

at the same time we have to deal with the other reality of different social structures which largely ignore the individual. I am suggesting that any philosophical discussion had better take into consideration the political reality of the situation we are dealing with, as well as our own moral conceptions. If we go into Africa or Asia and start preaching our gospel, we had better be preaching in a language they are going to accept.

Grandy: I do not think you can talk about species welfare unless you talk about the units that make up the species in terms of individuals. We talk about captive populations in this country, but I do not see how you can separate the population from the individual welfare of the animals that make up the group. If you want to go worldwide, you are talking about a few more animals but I do not think you can lose sight of the fact that each of those individuals is in fact a valuable unit within that species. It is only when we start to look at situations we are reading as black and white and we determine that some animals have a surplus population that those individuals no longer have value.

Rowan: How would you deal with the issue of whether or not to interfere with a coyote that has been hit by a car on the side of the road at Yellowstone.

Grandy: That is different. I am talking about the coyote that is fighting another in an area that has been interfered with by humans.

Rowan: What you have then is a sliding scale. The more we intervene the more responsibility we have toward the animals.

Grandy: Yes, the more we intervene the more responsibility we have. The extreme is where we have animals in zoos. We have to intervene incredibly in a situation like that. I do not know that captive breeding is going to or has worked.

Rowan: Once again, you are not disputing the fact that breeding has taken place and that populations in captivity are increasing. The issue is, what is the larger goal?

Grandy: Populations are increasing, and in some cases they are declining. But no one is addressing the issue of what we are going to do with these things. Hopefully we can get into that and talk about the

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Grandy: Populations are increasing, and in some cases they are declining. But no one is addressing the issue of what we are going to do with these things. Hopefully we can get into that and talk about the

nuts and bolts of the issue.

Hutchins: I have to take issue with that. Essentially that is why the AZA has set up a system, for strategic collection planning. We are identifying what is out there, what we think we ought to have, and the justification for having these particular animals. Is it public education? Is it captive breeding and reintroduction? Is it scientific research?

There are some pretty horrible things that happen in nature. For example, African hunting dogs tear an animal apart while it is still alive. It is a terrible thing to watch from our point of view, and from the individual animal's point of view it is not a good thing. I am saying there are some real ethical paradoxes there. Is the issue human intervention and the degree of human intervention, or what the effect of a particular situation is on a particular individual animal?

Rowan: That is basically what I was pressing Grandy on. The more you become involved in intervening with the animal, the more responsibility you are going to have. You can ignore these problems if you are not actually involved. From the point of view of the animal it does not make a difference who disembowels you.

Pacelle: Regarding Hutchins' point of suffering as the principle criterion in motivating us to concern, I think that there is more to the rights of wildlife question than purely the humane and suffering issue. I think that the general community has not seen that philosophy well developed because it has relied principally on a couple of major texts. Peter Singer's work Animal Liberation dealt with the industrial uses of animals principally, and included chapters about factory farming and the use of animals in laboratories. He entirely sidestepped the question of wildlife. Tom Regan's philosophy does not include wildlife as part of his central analysis. Wildness, autonomy of the individual animal are things that need to be put into the mix as well.

Lewis: I wanted to return to an earlier point of Jamieson's. I agree quite strongly that problems for animals are caused by human population or other kinds of human impact and that human society in general has stronger desires than merely protecting wildlife or ecosystems. Even with all of the nature television shows, and most people we know get the majority of their information from television, I do not see that translating in any real way into political support for preserving

animals. I really do not see it as a national movement of any kind. In my experience with politicians, having lobbied both in congress and spent a lot of time in state legislature in Massachusetts, they give lip service to such issues but do not vote to give one the kind of support that one desires. I think this is a real critical issue for all of us for unless there are more pillar people who are willing to support these kinds of conscious efforts we are doomed to failure.

Bostock: The use of the term "euthanasia" should be reserved for what it should mean: killing an animal in its own best interest. The paper does recognize that. This in not to say whether culling is necessary or not necessary, it is a question of the word used. The term "surgery" is used similarly with some as a euphemism for vivisection.

In regards to the well-being question, I absolutely agree with Norton that the term "rights" does not make much sense applied to a species. We talk about the health of individuals, but we are also concerned with the health of communities. We are involved especially with the well-being of individuals, in as much as individuals are conscious and are going to have feelings. In that sense it is only individuals that can enjoy well-being. We can talk about the well-being of a community or species but these two obviously clash. When the population gets too large, it suffers. This applies to humans as well. Clearly a wildebeest that has just been torn to pieces by hunting dogs is not in a state of well-being. We do know that the population of wildebeests would be in a bad way if there were not hunting dogs to control their numbers. The two together are in some sort of balance, presumably a state of well-being, so that is well-being of different populations or species in relation to one another.

Jamieson: Clearly it would be madness to suppose that we do not talk about community health and population suffering and the average American and other purely fictional entities. When you say that the death of this wildebeest is to the benefit of the population, that is just a shortcut way of saying that this individual wildebeest is suffering but that there are other benefits that will improve the quality of life for other wildebeests. The fact that we use language in that way does not mean anything more than the fact that the average American has 1.8 children, as if there is such a thing as 1.8 children.

Cohn: The welfare of the species is, I think, shorthand for the collec-

tive welfare of other individuals. It may also revert to the welfare of a process for assistance that may be perhaps separate from the welfare from a group of individuals. I am not certain that they are separate, but I can see welfare of the species referring either to a process or to individuals. I am not sure, for other reasons, that I see species welfare or rights as being overly relevant. In fact I would almost push this aside and agree with Norton that what is relevant is the welfare of future generations of humans. The question that again comes up is where do we intervene? Where do we have responsibility? It may also revert to the welfare of a process for assistance that may be separate from the welfare from a group of individuals. I am not certain that they are separate, but I can see welfare of the species referring either to a process or to individuals. Each of those things say to me that what the animals perceives is not what people feel is relevant. It is what is happening to us that people feel is relevant. If that is really the case, if that is the moral perspective that we are following, that suggests that the only things with rights are humans and future generations of humans.

Norton: I think we have to draw some distinctions here. What I meant to say was that I certainly think there is a descriptive concept of an individual number of species doing well or doing badly. I also believe that there is probably a broader sense, which is the collective doing well, somewhat independent of the individual. It was not my point that no one is looking out for the welfare of the species. My point was a moral one. I do not know that anyone feels a moral obligation to the welfare of a species, independent of how it affects any individual. It could be a useful descriptive concept which we would then in turn use to say that if a species is doing badly then we are in danger of morally harming future human individuals by reducing their possibility of experience. My point was not that you cannot keep track of how species are doing. It would be only an approximate moral judgment, that the moral force behind that would derive from an intergenerational ethic, not from any moral obligation to this moral composite. I think it is a mistake to say that there are people out there who are saying that the species has a right, and that the right of the species should be balanced against the right of individuals. There are people who are concerned about the well-being of species, but that is probably better interpreted as an intergenerational moral foundation.

Jamieson: I think part of what is at issue in this debate is our very

strong tendency to be individualists with regards to humans, and collectivists in relation to animals. I would like some standard for what makes a healthy population, but I would like to go back to what I think welfare is really about. The reason we care about human welfare is that human lives can go better or worse and we care about what happens to “me,” as do a lot of individual animals. Whatever moral framework we want to apply to humans, and I think the individualist one is the most plausible, should be applied to animals as well.

Hutchins: There is an inherent conceptual problem here and it has to do with the interrelationships that occur in ecological systems. If we are going to focus on individuals we need to think really hard about the impact of the individual on other aspects of the system and on other individuals. If, for example, we fail to cull elephants and they create a desert out of what was once a woodland, lots of other individual animals are going to suffer in the process. Perhaps we need to weigh the collective costs and benefits of that, the inaction versus the action. I do not know how one would go about doing that because it is very complex. Conceptually you can think about it and keep it within an individual framework even though you are talking about a system.

Jamieson: I agree. But yet for the same reason we wind up on different sides. I think that ecological concerns can be translated individually. The real issue is not that the environment is going to hell because animals are eating each other, but that enormous misery is being created because of human impact on the environment. If we are going to be moral individualists it is human behavior and its impact that we really need to think about and control.

Robinson: Your assumption is that species' welfare in some sense is an aggregate of individual well-being in that population. Take an action that is obviously not good for a specific individual. If such an action produced a 15% increment for all the other individuals and the population as a whole benefitted, then that would be morally justifiable. Is that what you said?

Jamieson: That question is deceptively simple, and I don't want to get into the complexities of how you would know that or measure that. Broadly, whether we are talking about human or non-human there can be cases where the sacrifices of individuals may be justified, and the justification is in terms of its impact on other creatures.

Robinson: So maybe the discussion is not so much about moral quality, but on the perception of the efficacy of certain actions.

Jamieson: That is part of it, but there is still a lot of mystification in our thinking that centers around the fact that we are individualists about human reflectives, about animals, and that if we would really think about animals in an individual way a lot of our policies would look different.

Hutchins: You could argue just the opposite from a collective point of view, and if we were in another culture we might. I think that the focus on individualism stems from the fact that we are in an individualistic society.

Bekoff: I think there is a theme to all these discussions, and that theme is the notion of wildness. The most recent statement was Hutchins' discussion of elephants. Elephants make a desert of something and other species die. I could say, "Big deal, that is what elephants do in the natural world." But that immediately gets me back to this notion of interference. It puts me, as a field biologist, in an incredible dilemma. Some of you study coyotes, and I have seen a coyote kill far more mice than I would like to think about. I have studied penguins and watched predators kill penguin chicks and eat penguin eggs. We should observe and learn about what is natural, what is wild. If we do not study what it is, how in the world can we learn what wild animals do?

The notion of intervention in sickness is an interesting one. To what diseases do wild animals succumb? How and do they recover? How are diseases transmitted among wild animals? If a coyote gets sick and I go out and do something for him, I cannot learn about any of these aspects of sickness. There is nothing cool about watching a coyote kill a mouse, and there is no doubt that the mouse is suffering. But if I interfere, how can I learn about the natural or wild world? Things happen in the world that we do not like. We do not ascribe moral agency to coyotes, we do not say the coyote is bad for killing the mouse. There are things going on in the world that we just should not interfere with. There is a sense of wildness that is beautiful, that we should respect and admire. It is too bad that deer get killed by wolves. I would perhaps like the world to be different, but it is not.

Hutchins: I agree. I had the same feeling when I was watching a geographic special on lions and hyenas. There were some incredible scenes of the horrors of nature. A female lion selects a spot for her den, the spot turns out to be a cobra's den and the snake bites and kills the cubs. It then bites the mother lion, she walks off salivating and is almost killed by hyenas. As a human being, I can feel sympathy and empathy for that animal, but I know that as a conservationist this is precisely what I am trying to preserve. That is called living with paradox, and in many cases that is what we are having to do. We are trying to take all of these ideas, according to what kinds of moral precepts we operate on, and categorize them. I think that is something we need to give some thought to.

Clifton: I want to bring the discussion back to the issue of culling. There is a study that Rowan did a few years back in which he studied the cultures of Humane Societies and discovered institutional *modus operandi* there was centered around euthanasia. This in turn created a lot of inertia as far as finding solutions to the feral populations. If you were to draw a diagram of this you would have a problem. You have to have a certain number of animals to have a viable population in captivity, but some animals outlive their usefulness in one way or another thereby creating a surplus. If you institutionalize the idea of "options" and the easiest option from a cost point of view is culling, what you are ultimately doing is institutionalizing culling. When you institutionalize something that is difficult and may be morally repugnant to some people you are institutionalizing with it a defense mechanism, the idea that culling, like euthanasia, is a sacrament.

Rowan: I think the problem of the issue of culling and euthanasia is in the use of the terms. It is, in fact, sacrifice, and that is not discussed. It becomes an established part of the process. It creates great distress and concern and we tend to ignore that it is the system.

WILDLIFE CONSERVATION ZOOS AND ANIMAL PROTECTION: EXAMINING THE ISSUES

The Wild and The Tame

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INTRODUCTION

Nearly all humans in the industrial world, at some time or other in their lives, must yearn for what they believe to be the freedom of life in a wilderness, "When wild in woods the noble savage ran", as Dryden wrote in the 17th century. But the concept of the freedom of a wilderness is as much a myth as the concept of the noble savage, although both are still very much a part of western thought. Today, we all know that there is no place in the world that is truly a wilderness, that is a place capable of sustaining plant and animal life, that has been untouched by anthropogenic influences which have been steadily increasing in impact for at least the past 40,000 years.

The Western belief that the world is divided into the "human" and the "natural" stems from the philosophy, first propounded by the ancient Greeks, notably Aristotle, that all living organisms could be placed in a Scale of Nature or Great Chain of Being with "primeval slime" at its base and "Man" at its summit. This belief, which is imbued in Christianity and in all aspects of western civilization, has led to a great divide with "the wild" on one side and "the tame", that is all the animals and plants that are exploited by humans, on the other.

I should like to argue that human influences on all faunas and all biotopes are now so powerful that there are no longer any grounds for dividing the wild from the tame. And, as the master predator, and for its own survival, the human species must learn to manage the world as one great global ecosystem.

WHAT IS WILD AND WHAT IS DOMESTIC?

It is difficult to define what is a wild and what is a domestic animals. We usually think of a wild animal as one that is fearful of humans and runs away if it can. But this fear of humans is in itself a behavioral pattern that has been learned from experience of human predation over countless generations. A "wild" animal that has had no contact with humans has no fear of them and is quickly exterminated, like the dodo. On the other hand animals in a wildlife reserve will lose their fear after some generations of protection from human hunting. In one sense it can be said that a domestic animal is just one which has lost its fear of humans and will breed in captivity, but it is also much more than this because the species of domestic animals have evolved by natural and artificial selection in association with human societies.

Domestication is both a biological and a cultural process, which begins when a small number of animals are separated from the wild species and become habituated to humans. If these animals breed they form a founder group, which is changed over successive generations both in response to natural selection under the new regime of the human community and its environment, and by artificial selection for economic, cultural, or aesthetic reasons (Clutton-Brock, 1992a). The relationship between human and animal is transformed from one of mutual trust in which the environment and its resources are shared to total human control and domination (Ingold, 1994).

Once domestication is established new breeds are produced by further reproductive isolation leading to genetic drift, as in the founder populations of new subspecies in the wild. The founders of the new breed contain only a small fraction of the total variation of the parent species, and it becomes a genetically unique population, which continues to evolve under natural and artificial selection.

A determining factor in the evolution by natural selection of domestic species is that of climate. The effects of climatic selection on domestic animals appears to be identical to the well-known correlations in size and body-shape that can be seen in subspecies of wild animals across a geographical cline. This can be seen, for example in breeds of horses, as reflected in the horse breeders' terms, "cold-blooded" for the northern heavily-built horses and "hot-blooded" for the lightly-built Arabs.

All breeds of horses have originated from one wild species, Equus ferus, which ranged over the whole of Europe and Asia at the end of the Pleistocene, although it is probable that over this vast area there were several subspecies of the wild horse (Clutton-Brock, 1992b).

IMPROVEMENT AS A BIOLOGICAL CALAMITY

Breeds of domestic animals should be considered as local ecotypes or demes with special adaptations to particular micro-environments. Breeds of domestic livestock that evolved in one biotope are as well adjusted to their environment as the wild species, and it is this perfect adaptation that has been destroyed and continues to be destroyed by the policies of so-called "improvement." The impetus for improvement began in Europe in the 18th century when the industrial revolution made it necessary to increase the quantity and quality of meat and wool for the rapidly expanding urban populations. But the improvers, of course, knew nothing of genetics or evolution and did not realize that by crossbreeding animals from different localities they were destroying populations that had taken thousands of years to evolve. Today we should know better, but the legacy of the improvers has been found very hard to eradicate, as can be seen from the many schemes to improve cattle in Africa. For example the native cattle of southern Ethiopia, the humped Boran, which only needed to drink every three days, in perfect adaptation to their semi-desert environment, have been "improved" by crossing with north European breeds. Similarly, the ancient Mashona breed from Zimbabwe has been "improved" by crossing with Hereford beef cattle. In the short term, this improvement leads to high productivity, but there is a loss of the unique genetic constitution of the breed that has evolved in adaptation to the local environment. Susceptibility to stress and to disease is increased and the need to protect the new, valuable but vulnerable herds led to such misguided policies as the game-eradication schemes of the 1960s, in attempts to control tsetse flies. It has to be realized that anciently-established domestic livestock are as much a part of the biotope as the wildlife and if the balance in their management is upset the whole ecosystem will suffer.

The influence of ancient breeds of domestic livestock is apparent in every part of the world, whether it be the Sahel where herds of camels and goats range, or the landscape of Europe which has been trans-

formed over the last 5000 years by grazing animals. The species of trees allowed to grow in forests has been determined by the feeding of vast herds of pigs put out to pannage, hillsides have been turned to pasture by the grazing of millions of sheep and cattle, and moorlands have been created by overgrazing.

Everywhere, domestic animals have evolved in adaptation to their local environment and its particular wild flora and fauna. It is therefore essential that any conservation or management scheme must consider the role of domestic animals and it is just as important to maintain the local breeds of livestock as it is to preserve the wildlife. It is with this realization that there is a growing number of societies in Europe and America devoted to the conservation of rare breeds of domestic animals.

CULTURE IN DOMESTIC ANIMALS

It is not only the physical adaptations of local breeds of domestic animal that are lost by improvement, it is also the culture, that is the learned behavior of the animals, which is lost. This was shown by Elizabeth Marshall Thomas (1990) in her remarkable account of the lions of the Kalahari desert and their interaction with the Bushmen (!Kung San). In the 1950s these people turned from hunting to herding livestock. Their indigenous cattle had their own culture and understood the danger of lions. When going out to graze, which they did unattended, the cattle always walked in single file, varied their direction, and returned well before sunset. However, when a foreign bull was introduced to the herd their learned behavior was disrupted, ending in a massacre of the cattle by thirty lions. The usual outcome of such an event would be the shooting of all the lions.

Many people deny that there can be culture in animal societies, but this in great part because it is one of those terms, like consciousness, that is so hard to define. In this context I define culture as a way of life imposed over successive generations on society of humans or animals but its elders. Where the society includes both humans and animals then the humans act as elders.

The process of taming a wild animal, whether it is a lion or a wild goat can be seen as changing its own culture. The animal is removed from the environment in which it learns from birth either to hunt or to flee

on sight from any potential predator, and brought into a protected place where it has to learn a whole new set of social relationships as well as new feeding and reproductive strategies.

A domestic animal is a cultural artifact of human society but it also has its own culture, which can develop, say for a cow, either as part of the society of nomadic pastoralists or as a unit in a factory farm. I should like to argue that domestic animals live in as many different cultural situations as humans and that their learned behavior is just as responsive. In the absence of predators, domestic animals adopt the culture of their human owners and so closely can they fit within it that they seem to have lost all links with their wild progenitors. The more social or gregarious in their natural behavioral patterns are these progenitors the more versatile will be the domesticates, with the dog being the extreme example of an animal with a human culture.

The loss of their own culture can be just as disastrous for domestic animals as it is for wild animals that are set free after being bred in captivity. It is probable that after some generations of breeding in factory farms, pigs or cattle would lose all knowledge about the choice of foodstuffs in an open field. As long ago as 1950, Hediger in his classic book on Wild Animals in Captivity asserted that domestic animals are unnatural in that "they eat only one particular kind of food." But this monophagy is forced upon them and in the long run can only be detrimental, as has been shown by the outbreak of BSE in the U.K.

FERAL ANIMALS OR NEW WILD SPECIES?

Feral animals can be defined as those that live as a self-sustaining population in the wild after a history of domestication. And, whereas the case for the conservation of indigenous breeds of domestic animal is usually clear, the problems are much more complicated with feral animals. For a start it is often very difficult to know whether a so-called species is truly wild or of anciently feral descent. The European mouflon is just such an example. This sheep (Ovis musimon) was to be found living wild only on the mountains of Corsica and Sardinia until the last century when small numbers were removed to parks and mountains in Europe as a game animal. It was generally believed that the mouflon was a relic of wild sheep that were originally widespread throughout Europe. However we now know, from the absence of any

fossil records of sheep throughout Europe, including the Mediterranean islands, that these sheep are not relics of wild sheep, but perhaps just as importantly they are relics of the very earliest domestic sheep that were taken to the islands, probably at least 7,000 years ago (Poplin, 1979). The world record for mouflon horns according to Rowland Ward's Record of Big Game was shot on Sardinia by the Duke of Bedford in 1903. But should the horns of the mouflon be hung as trophies or kept in scientific collections as interesting specimens from very primitive domestic sheep?

Rather the same situation can be seen with the dingo, and other feral dogs like the New Guinea singing dog and the native American dogs, but these canids are in a much worse predicament than the mouflon as they are very close to losing their genetic integrity through interbreeding with European dogs. The dingo is a fascinating relic of the earliest domestic dogs of south east Asia, but it has had a very bad press from the Europeans in Australia, having been treated as vermin by the sheep farmers who have killed vast numbers with the encouragement of government bounties.

It is probable that a very small number of dogs were taken to Australia, by boat, thousands of years ago with immigrant peoples. This must have been before the domestication of the pig which was never taken to Australia as it was to New Guinea and the Pacific Islands in the early prehistoric period. However, it was later than 12,000 years ago, when Tasmania was separated from the Australian continent by the sea breaking through the Bass Straits, as there are no fossil records of dogs on Tasmania. The small founder group of dogs in Australia would soon have begun to breed away from human control, and later generations expanded to spread widely over the continent.

Until the arrival of Europeans in Australia the dingo was part of the ecosystem inhabited by human hunters and their prey. Its extinction would be a great loss because the dingo has not only been a part of the Australian fauna for thousands of years it is also part of the living heritage of Aboriginal culture.

Another canid which is not feral but is in an equally problematic situation from the conservation point of view is the red wolf. Now that DNA analysis has been shown that this canid, at least in its present form, is not a separate, endangered species of wolf but a hybrid be-

tween the grey wolf and the coyote (as many have always believed), should the strenuous efforts spent on its conservation be continued (Paradiso & Nowak, 1971; Wayne & Jenks, 1991)? I believe that they should and that the red wolf can be considered to be a "new" species that has evolved as a result of anthropogenic interference.

The latest example of "natural" hybridization to be discovered is the offspring of the mating between a blue whale and a fin whale, which is presumed to have occurred because the blue whale was unable to find a mate (media reports in the U.K. 3 March 1994).

Another species which may be called "new" is Przewalski's horse. The 700 or so "wild" horses living today have a distinct, uniform appearance, which differs considerably from that of their thirteen ancestors which were brought to Europe at the end of the last century. These were a "motley lot" and included at least one feral horse (Mohr, 1971; Clutton-Brock, 1992b). The effects of breeding the horses over the past 90 years have produced incipient characteristics of domestication. The cranial capacity has been reduced, the crowns of the teeth have become less hypsodont and the muzzle narrower. The main and tail are fuller and white marks sometimes appear on the forehead. The age at which the horses become sexually mature has been lowered from five to two years.

The Przewalski horse, like the Arabian oryx and other highly endangered species that survive only because they have been bred in captivity, is valued for its "wildness", yet many individuals are perfectly tame. This is an example of the anomaly in human thought which has been with us for thousands of years, since the time of the ancient Assyrian kings who kept lions in cages, only so that they could be let out to be shot with arrows. The modern justification, of course, is that we are not only saving a species from extinction but also, by reintroducing it to the wild we are preserving its habitat.

CONCLUSIONS

I fully support the breeding of endangered species in captivity and in all reintroduction schemes. All that I would like to argue is that we should try not to divide the world into the wild and the tame but to think of it as one community of life. For at least the past 10,000 years

the faunal compositions of whole continents have been molded by human activity. Ungulates have been hunted to extinction and the killing of carnivores in their millions must have had a great impact on their behavior and on predator-prey relationships. For example, I believe that human persecution has transformed the wolf from a diurnal to a nocturnal hunter. A huge diversity of species has been moved around the world and the grazing of domestic livestock has altered environments everywhere.

Is the wild giant ox, or aurochs (*Bos primigenius*), extinct or is it one of the most common and widespread large animals in the world? In terms of genetic constitution every domestic cow must carry a considerable proportion of the genes of its progenitor, the aurochs. Efforts to "reconstitute" the aurochs by crossbreeding various unimproved breeds of cattle by the Heck brothers in Germany before the war, were moderately successful in terms of external appearance (Zeuner, 1963: 205). However, it is doubtful whether the full genetic complement of the wild ox could ever be recreated because of the genetic drift that occurs whenever a new breed is developed.

Reducing the numbers of breeds by crossbreeding and improvement for greater, short term productivity will reduce the genetic diversity of the species to dangerously low levels. This could be catastrophic when the wild progenitor is extinct, as with cattle. It is therefore imperative to urge that the farm park, which aims to conserve rare or declining breeds of domestic animals, is as valuable as the wildlife park. Both the wild and the tame need strategies for conservation and both are necessary for the survival of ecosystems, especially those in fragile environments where the indigenous livestock have lived in balance with the wildlife for upwards of 5,000 years.

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CLUTTON-BROCK DISCUSSION

Serpell: I agree with a very large number of the points made, particularly the notion that people tend to denigrate or downgrade domestic animals. This is obvious with ecologists, particularly ecologists that study wildlife. We also see this in concern for the welfare of animals. If we saw rhinos and tigers being kept the way we routinely keep farm animals there would be a national outcry, but we seem to be happy to accept this for domestic animals. Clutton-Brock makes the point that we tend to perceive domestic animals as in some way corrupted by human hands and less worthy of concern.

She goes on to make a plea for many of our rarer and more ancient breed domestic animals, proposing that we stop thinking about the wild/domestic dispute and instead try to think of it as a continuum, giving all animals an equal share in our concern. I agree that we should preserve locally adapted domestic genotypes. I accept her point that the well-intentioned but clumsy western attempts to improve on what exists already in third world countries are more productive in a short-term sense but very damaging in the long-run sense.

I depart from Clutton-Brock on the idea of wild and tame as a continuum. There is a distinction, and it is a distinction based on degrees of human control or coercion. The question then remains whether there is any morally relevant difference or distinction between wild and domestic animals. This in turn raises the question as to whether we should devote resources and energy to conserving domestic breeds. Having built up this argument she then contradicts it by saying that domestic animals are artifacts of human endeavor. If they are then we cannot use the same yardstick to measure their value. Some of the value of wild animals is a product of their wildness. So then we have to ask what is the value of the domestic animal? I want to get away from its potential value as genetic stock, that it has an anthropocentric value to us because we might be able to use it in some way for the economy, and think instead about the intrinsic value of the animal

Lacy: It is not unclear to me what domestic is, and neither is the clarification between domesticity and wildness. Domesticity comes about because we artificially breed to produce traits that are of benefit to us, thereby interfering with evolution. It is true that domestic breeds

evolved in and with their own environment, but only in a trivial sense, for the environment they evolved in is highly modified. We created an artificial environment for them in which to evolve. We control their evolution so that they develop traits that benefit human economy. So they are, in a sense, corrupted by human hands. They carry over traits from the wild, and if released they can recover some of that wildness and evolve again, adapted to their needs rather than our needs.

Domestic animals not only have small brains, they also have slow reaction times, poor assimilation efficiencies of nutrients, are subordinate in encounters with wild animals and are disease prone. Clutton-Brock suggested that the preservation of domestic breeds is important or essential for their environment, and again I see it only in a highly modified way. The environment for domestic livestock might be an extremely artificial rather than wild environment that has low biodiversity and very low welfare for a great many other organisms. It is a way of keeping human-created and modified environments the way that we want them, as far from wild as we can get.

Perhaps there is nowhere that is truly wild anymore, that all animals are influenced by humans, but there is still a difference between animals evolving to their needs as opposed to our needs. It is important to protect history for cultural or economic reasons, even humane reasons. It seems counterproductive to protect them from the biodiversity of conservation, for maintaining some of the sense of wildness or natural functions of the ecosystem.

Clutton-Brock: I dispute some of what you say. For example, cattle in Africa have been there for five thousand years and have evolved through natural selection. They have become immune to tse-tse, for example. Throughout Africa there have been large numbers of breeds of cattle that have literally evolved with the environment and with the wildlife. I would contend that the ecosystem does, to a certain extent, depend on the maintenance and grazing of this domestic cattle. I am simply trying to point out that domestic animals should not be ignored when we are trying to preserve the ecosystems.

(?): Some of this depends on the animal we are talking about. You seem to be chiefly talking about food and laboratory life. When I was contemplating this problem I thought of dogs. The dog is a species that has been used as a food animal, although not originally domesti-

cated for that function. A lot of the changes to the dog, while they have been beneficial to human beings, have also been beneficial to the dog in the context of its partnership with humans. We cannot say it is simply a domestic animal. To me it is still a unique species and is living in a partnership with humans, mutually dependent on humans. Yet when faced with the unfortunate decision to conserve Pekinese or wolves, my mind would go to the wolf. However, I have to recognize that the Pekinese is a unique creation.

Hutchins: Domestic animals were essentially not totally domesticated for the benefit of people. In Covenant of the Wild the author argues strongly that domestication was originally a symbiotic relationship between humans and animals, almost a mutual coming together, especially in regards to the dog. It was not a “taking of prisoners” and a manipulation of their genes for human benefit but it ended up as mutually beneficial in many cases. Certainly manipulation took place in many cases later, but this is a misconception that has led us to a number of ethical positions that we may have to rethink.

Pacelle: Hutchins, are you arguing that we have some kind of moral obligation to preserve all of the creations of domestic rearing such as turkeys in factory farms that cannot even breed among themselves and whose health problems begin from birth?

Hutchins: What I am talking about concentrates on animals that have been around for thousands of years. I see that as being different in some extent to the type of manipulation we have done to farm animals over the last fifty years. The animals that Clutton-Brock describes have been evolving on their own, not just selected for people, by people. I see an important difference between the two.

Pokras: I do not think we have any moral obligation to perpetuate most domestic breeds. I would not feel that the world was losing something substantial and meaningful if these breeds passed from existence, as long as the individual animals were well-treated up until their natural death.

Jamieson: What this kind of exchange indicates is how unclear we are about what it is we value. I have heard three different conceptions in this discussion. One, we value variety. Two, history is valued, the connection of domestic breeds to our past and our cultural of evolu-

tion. Third, wildness. All these things are really distinct values and they lead in different directions.

When the Spanish arrived in the new world there was a debate among the Jesuits about the status of the native people. One view was that they were animals, making it acceptable to use them as draft labor. The other view was that they were congenitally human and ought to be converted. There was a very serious theological dispute about how they should be treated. This raises the notion that familiarity and knowledge are very important for the understanding of the capabilities and compatibility, and therefore value of these animals. This does not mean you have to know each particular animal in order to value it.

Grandy: I wanted to shift the focus of the debate to something Clutton-Brock mentioned earlier regarding the relevance of red deer and elk and what role the king played in the situation we face today with respect to attempts to promote the consumptive use of wildlife in developed countries. Things have changed overwhelmingly and that model cannot be applied. We have control of trade, methods of killing that are far more effective and far more destructive than ones we saw in the king's time, much less authority in the sense of government ability to control what is happening. We have seen in third world countries that wherever these well-meaning attempts to promote consumptive utilization sustainably have been failures.

Rowan: I would like to close the day's discussion at this point, but I would like to sum up a few points that have been raised today. There is a human need to classify, a necessity to classify animals as domestic, wild, tame, etc. We try to push things into neat little boxes in which they refuse to go.

In terms of the Steven's comment regarding the ascetic elements of breeding, there is an interesting comparison between Japan, America and Germany. The Japanese attitude toward wildlife is ascetic, not moralistic, humanitarian or ecologicistic. The American attitude is more humanitarian, more moralistic and ecologicistic. Germans are very moralistic, very humanitarian and very ecologicistic. There are these differences in attitudes in terms of what one values, which brings me to the next issue that came up constantly throughout the day, one which we never actually confronted directly but was talked around quite a bit; the issue of value, valuing the wild, the domestic and the

tame.

Another issue underlying today's discussion was human agency. Some of us have much less regard of human agency than others in this room. There is a conflict that combines some of the basic ideas we have here. If one does not trust human agency then new knowledge is useless because one does not trust humanity to use it in a wise manner.

NATURALIZING AND INDIVIDUALIZING ANIMAL WELL-BEING AND ANIMAL MINDS: AN ETHOLOGIST'S NAIVETÉ EXPOSED?

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SUMMARY

People from many different disciplines are interested in the notion of nonhuman animal (hereafter animal) well-being. Among the topics I consider here are included how the terms "well-being" and "welfare" have been used, and also how well-being or welfare is assessed. I favor naturalizing and individualizing the notion of well-being by using the species-typical lives of wild individual animals as standards for assessing well-being. I argue that well-being is at its highest for individuals who are allowed to live their own kinds of natural lives in the wild (or what remains of the wild), as far away as possible from the numerous and pervasive intrusions of humans. While different criteria for assessments of well-being may have to be used for wild individuals, for wild individuals who are captured and maintained in captivity, for those individuals born in captivity but who would have lived the life of a wild animal if their parents had not been taken captive, for the offspring from frozen zoos, and for domestic animals, naturalizing and individualizing well-being is consistent with attempting to prevent individuals in the wild and those animals in various forms of captivity from being (further) exploited by humans. Much concern for animal well-being develops only after they have been exploited. While attempts to "right wrongs" may be laudable, perhaps we should step back and see if we are able to reduce the number of wrongs that we initiate or in which we partake.

I also consider why I, a scientist interested in cognitive ethology, am also deeply interested in animal well-being. Naturalizing and individualizing animal minds can be taken to mean that I favor studies of

animal cognition in conditions that most closely resemble those in which individuals have evolved or in which they currently reside in nature. In this section I briefly discuss the rapidly growing field of cognitive ethology and draw some connections between the study of animal minds and animal well-being. Other topics I consider include: (i) the importance of studying individual animals carefully and trying to learn as much as we possibly can about their lives to facilitate coming to a fuller appreciation of what humans can do to improve their well-being; (ii) the use of common sense, subjectivity, anecdotes, anthropomorphism, sympathy, empathy, and “hard” scientific evidence to inform our views of well-being, and the recognition that none, taken alone, including science, can do the job adequately; (iii) how appeals to the supposed brutality of nature are used to inform (and also to misinform) decisions about how animals ought to be used by humans; (iv) the use of individual characteristics rather than group membership in our deliberations about well-being; and (v) the importance of giving careful attention to claims that there are differences among individuals with respect to cognitive abilities that are also morally relevant. Here I will discuss what may be conveniently, but not disrespectfully, called, “not so cognitive individuals.”

I conclude that: (i) well-being has to do with animal feelings and that there are plenty of data for many animals that strongly indicate that they have feelings; (ii) all sorts of data, including subjective impressions, need to be taken seriously because there may be as yet unimagined ways in which some individuals experience pain, suffer, and interact with their social and nonsocial worlds; (iii) it is difficult to argue for morally relevant differences in cognitive abilities; (iv) whatever connections there might be between an individual’s cognitive abilities and the different ways in which it is thought she can be used can be overridden by that individual’s ability to feel pain and to suffer; (v) individual characteristics rather than group membership should be used to inform our decisions about what sorts of treatment are permissible; (vi) interfering in the lives of wild animals is justified only on rare occasions; (vii) removing individuals from the wild and maintaining them in captivity are major intrusions on their lives, permitting captive animals to breed should only be done on rare occasions, treating domestic animals less respectfully than their wild counterparts is unjustified, and appeals to the supposed brutality of nature fail; (viii) more comparative data are needed concerning animal sentience, cognition, and behavior especially from diverse species whose lives, sensory

worlds, motor abilities, and nervous systems are different from those of animals with whom we identify most readily or with whom we are the most familiar; (ix) interdisciplinary input is necessary as well as discussion among people representing similar areas among which there may be blurred boundaries; (x) there needs to be a marriage between applied and more theoretical endeavors; it is essential to bridge the gap between detached ivy tower views on animal well-being and practical concerns; (xi) we should err on the side of animals whenever we are uncertain of their abilities to experience pain and to suffer; (xii) although some fuzziness remains about our notion of well-being and although it is impossible to know precisely what it might be to be like another individual, perhaps many may know more than they realize or are willing to express; and (xiii) we should all care about animal well-being, not only when it is convenient for us to do so.

INTRODUCTION: SOME PERSONAL VIEWS AND THE VALUE AND NECESSITY OF INTERDISCIPLINARY TRESPASSING

“At the onset of electric shock the [naïve] dog runs frantically about, defecating, urinating, and howling until it scrambles over the barrier and so escapes from the shock. . . . However, in contrast to the naïve dog, it soon stops running and remains silent until shock terminates . . . it seems to ‘give up’ and passively ‘accept the shock’.” (Seligman, Maier, and Geer, 1968, p. 256)

“In one set of tests, the animals had been subjected to lethal doses of radiation and then forced by electric shock to run on a treadmill until they collapsed. Before dying, the unanesthetized monkeys suffered the predictable effects of excessive radiation, including vomiting and diarrhoea. After acknowledging all this, a DNA [Defense Nuclear Agency] spokesman commented: “To the best of our knowledge, the animals experience no pain’.” (from Rachels, 1990, p. 132; my emphasis)

“The least I can do is to speak out for the hundreds of chimpanzees who, right now, sit hunched, miserable and without hope, staring out with dead eyes from the metal prisons. They cannot speak for themselves.” (Goodall, 1987, p. 577)

“I study foxes because I am still awed by their extraordinary beauty, because they outwit me, because they keep the wind and the

rain on my face . . . because it's fun." (Macdonald, 1987, p. 15)

These quotations clearly indicate the not so astonishing fact that there are many different opinions on how humans view and interact with nonhuman animals, hereafter animals, and why they do so [use of the pejorative phrase subhuman animals (e.g. Gallup, 1970, p. 87; Björkqvist and Niemelä, 1992, section VI entitled "Female Aggression in Subhuman Species; Kennedy, 1992, p. 17; Adler, 1993, p. 291) is insulting to animals and should be strongly discouraged]. Not surprisingly, there are also a wide variety of views about animal well-being, what we should do about it, the nature of animal minds, and possible connections between the nature of animal minds and well-being. These topics will be addressed in this essay.

The first question that I asked myself as I started writing this paper was "Why's a person like me doing something like this?" My reasons seem clear to me and I hope they will become clear to you. I, a North American Caucasian male, have spent many years studying wild animals, learning about animals from others, and teaching others about the behavior of diverse animals. Through these experiences I came to respect the lives of animals independent of my own life as a human being; I could never push aside my interests in the animals' lives simply because I thought of myself merely as another animal who wanted to learn more other cohabitants of this planet. My personal views, while certainly open for discussion and change, and they have indeed changed, stem from these numerous intimate encounters. But, although I have always been concerned with animal well-being, I have not always applied the same standards of conduct to my own interactions with animals. However, I have changed my habits with the passage of time. For example, early in my graduate career, I confronted a professor who strode into a course in comparative physiology arrogantly claiming while holding a struggling rabbit in his hand that he would kill the rabbit using a punch named after this poor beast, I refused to partake in laboratory experiments in which dogs were killed as part of a medical school physiology course, and I stopped doing doctoral dissertation research at the same time because I could no longer kill (or as some call it, sacrifice or euthanize) cats. Nonetheless, I did do some studies on the development of predatory behavior that permitted young coyotes to kill young mice and chickens in staged-encounters. I would no longer do these sorts of studies. First, much of the same information could be collected in the field, some-

thing that I later did. Second, there might have to be some knowledge that we do not obtain until there are more humane ways to do necessary studies. Perhaps my ability to change will show others that they, too, can change.

As I will discuss below, how individual humans view animals and represent them to themselves clearly informs their positions on matters of well-being and the nature of animal minds. I am not surprised how influential have been my contacts with other animals, and this influence is clearly reflected in my views on their well-being and the nature of their minds including: (i) putting respect and admiration for other animals first and foremost; (ii) recognizing that almost all of the methods that are used to study animals, even in the field, are intrusions on their lives—much research is fundamentally exploitive; (iii) recognizing how misguided are speciesistic views concerning vague notions such as intelligence and cognitive or mental complexity for informing assessments of well-being; (iv) focussing on the importance of individuals; (v) appreciating individual variation and the diversity of the lives of different individuals in the worlds within which they live; and (vi) using broadly based rules of fidelity and nonintervention as guiding principles.

While I realize that I am trespassing into other disciplines, and that some of my arguments are not fully developed in the way that philosophers might like them to be—in some instances I am “talking” philosophy rather than “doing” philosophy—and also that there may be unanticipated places where my views may lead, I think that interdisciplinary exchange is valuable and necessary. I want to know what philosophers are thinking about cognitive ethology and I think that it would be useful for philosophers to know what people like me are thinking about philosophical issues that are related to animal well-being; I can help them see how I view similar problems from a context with which most of them have had little or no direct experience. For example, I discovered the work of Paul Taylor (1986) after I had written about certain aspects of fidelity and nonintervention. An understanding of the ways in which I arrived on similar (though not exactly the same) terrain may be helpful to him if he was to consider revising some of his ideas (for example, locating domesticated animals and others who are dependent upon humans more squarely in his biocentric ethic and using data from cognitive ethological studies for learning more about trust and deception; see below). Simply put, we

should strive to keep boundaries between disciplines semi-permeable, for disciplinary arrogance will delay making progress on important issues (Bekoff, 1994a), as might the fear of making mistakes (Orr, 1994).

From a less personal view, I also hope to show how important are broad, comparative, and evolutionary perspectives on animal behavior, that may seem to be of greater interest to my colleagues who reside in various ivy towers than to those who are out there "getting there hands dirty." I also hope to convince you that there has to be a harmonious marriage between those who are interested in more theoretical analyses of well-being and behavior and those who are interested in more practical matters about well-being and behavior.

ANIMAL WELL-BEING: A DIFFICULT YET USEFUL NOTION

"There are many experiments that, for ethical reasons, cannot be done on humans but can be done on animals." (Crick, 1994, p. 21)

"Obviously, using humans for such [neuroanatomical] experiments is out of the question." (Crick, 1994, pp. 109-110)

"Capturing an animal—from the wild state—is considerably more difficult to justify than keeping it in a zoo." (Bostock, 1993, p. 186)

First things first: It is impossible now (and perhaps it will be forever) to offer a definition of well-being that applies to all animals in all situations (Broom, 1993; Fraser, 1993; Mason and Mendl, 1993; Moberg, 1993; for more general discussions see Griffin, 1986; Elster and Roemer, 1993; Frey and Morris, 1993; and O'Neill, 1993). Even the introductory editorial in the first volume of the journal *Animal Welfare* does not contain a definition of the term "animal welfare" or of the term "animal well-being." It may actually be because many people from different areas such as anthropology, biology, economics, psychology, psychiatry, and sociology are interested in well-being for their own (and sometimes common) purposes that a single (or even a few) operational definition(s) of the widely used term "well-being" is elusive. Reasons that it is difficult to come up with a broadly applicable definition of "animal well-being" include the force of subjective (and often anthropo-centric) judgements of well-being that are related to personal views that inform the type and strength of one's ethical concerns (e.g.

Bateson, 1991; Tannenbaum, 1991; Mason and Mendl, 1993), and how far one is willing to go to give the animal the benefit of the doubt (Mason and Mendl, 1993; Bekoff, 1994b; but see Broom, 1988, 1993). Common sense, which varies among individuals, also plays a role in assessments of well-being (Fraser, 1993). But, there are no compelling reasons to demand explicit definitions of difficult concepts (including well-being and consciousness) before studying them; using working definitions as a guide is allowable even by those who demand empirical verification in their scientific endeavors (e.g. Crick, 1994; see also Jamieson and Bekoff, 1993 and Allen and Bekoff, 1995 for general discussion).

Animal well-being “versus” animal welfare: It is important to understand how different people conceptualize and apply the notion of animal well-being. The terms “well-being” and “welfare” often are used synonymously (Broom, 1993; Fraser, 1993). Fraser (1993, p. 38) distinguishes four approaches in which the terms “well-being” and “welfare” are used either as synonyms or to refer to different notions. The lexical approach allows the two terms to be used interchangeably, based on dictionary definitions, while the timorous approach “uses ‘well-being’ because ‘welfare’ sounds like a political hot potato.” The subtle approach uses “welfare” to refer to “the long-term good of the animal” and “well-being” to refer “more to the animal’s short term state, especially how the animal feels.” On this view, a painful event such as a vaccination may enhance an individual’s welfare but reduce her well-being. Finally, the pragmatic approach attempts to reduce confusion “by using ‘well-being’ to refer to the state of the animal and ‘animal welfare’ to refer to the broader constellation of social and ethical issues.” Broom (1993, p. 17) also notes that well-being “has a stronger connotation of subjective feeling in its use. It is used to refer more to the individual’s perception of its state than to the state itself.”

While Fraser prefers the pragmatic approach, I think that the lexical approach also has a lot to offer, mainly for practical reasons; many people simply use “well-being” and “welfare” interchangeably (see, for example Hurnik’s, 1993, p. 28 unannounced slide between them) and ignore the subtleties. Furthermore, quibbling over terms might deflect attention away from the most important matter at hand, namely, the treatment to which individual animals are subjected. If specialists cannot agree on definitions, then those who look to these individuals for guidance may wrongly conclude that there is no reason

to be concerned with animal well-being unless it can be defined. Nonetheless, the pragmatic approach is valuable because it recognizes that the state of the animal, her well-being, counts and also that there are social and ethical issues involved, her welfare, that, perhaps, are less time-bound to the immediate present. For convenience, I will use the term "well-being" in the sense of the pragmatic approach, but it will be clear that I realize there are many broad social and ethical issues involved regardless of which term is used.

By using the terms "well-being" and "welfare" differently, and by recognizing that there are broad and social and ethical issues that may be extended beyond sentient animals, there is the possibility that one could also be concerned with the welfare of nonsentient organisms and objects. This is beyond the scope of this paper (see, for example, Rolston, 1988; Varner, 1990, 1994a; Hettinger, 1994), but there are important connections between how the welfare of sentient and nonsentient organisms are viewed. For example, Varner (1990) differentiates between preference interests and biological interests, where the former are defined in terms of "one's actual and/or enlightened desires" and the latter are defined in the form of "X is in A's interest" or "X would be good for A" (p. 265). By marking these differences he discusses what he calls "the biological theory of welfare" in contrast to the "mental state theory of welfare," and this allows him to claim that "something's being a living organism makes its biological needs morally significant" because what defines the interests of many animals "includes interests which are defined by the biological functions of organs and subsystems in addition to interests which are defined by our actual or ideal preferences" (Gary Varner, personal communication).

Well-being is a term that is applied using a variety of measures—behavioral and physiological—including our own subjective assessments (Barnett and Hemsworth, 1990; Bostock, 1993; Broom, 1993, Fraser, 1993, Mason and Mendl, 1993; Moberg, 1993). Questions about whether or not individuals are in good or poor states of well-being include are they behaving normally, do they seem to be enjoying their existence, are they happy, are they maintaining themselves, are they healthy, are they suffering from unusually high levels of disease, are they coping with their environment, are they reproducing, and are they living as long as they might be expected to? One difficulty with the otherwise favored interdisciplinary approach to assessments of

well-being is that it is impossible to assess simultaneously all possible pertinent measures. What constitutes good well-being and what constitutes poor well-being usually boils down to consensus opinions based on the use of varying proportions of scientific data, common sense, subjective impressions, and individual moral codes.

Although there are many possible measures of well-being, my preference is for assessments of well-being in which animal's feelings play the most important role (see also Duncan, 1993a,b; Finsen and Finsen, 1994, pp. 196ff, provide an historical account of some of this literature). On this view, assessments of well-being demand an informed and deep appreciation of an individual's cognitive abilities, which might include their ability to sense the passage of time, to make plans, to have future beliefs and goals, to enjoy certain sorts of social interactions, and to avoid pain and suffering. An individual whose freedom of movement is restricted to a small area might suffer from not being able to move about and a predator who is not allowed to hunt for food might suffer from not being able to hunt, but there might be no physical pain involved in either case. In his discussion of human well-being, Griffin (1986) argues for an informed desire account in which people take into account not only immediate, but also future, desires. He does not exclude animals from his notions of well-being (p. 325, note 19). Some values that lie at the heart of human well-being on Griffin's account include accomplishment, autonomy, freedom from pain and anxiety, enjoyment, and deep personal relationships. Certainly, the behavior of some animals leads to reasonable inferences that these sorts of desires and needs are important in their lives (see below and Finsen and Finsen, 1994; DeGrazia, 1995).

Of course, how we come to terms with what animals feel and if and how they experience pain and suffer present very difficult matters (see below), but difficult does not mean impossible, and future challenges should be welcomed and pursued rather than pushed aside because they are difficult. While McGlone (1993, p. 28) views "as simplistic and inappropriate" the view that uses animals' perceptions of their own feelings to assess welfare, his suggestion "that an animal is in a state of poor welfare only when physiological systems are disturbed to the point that survival or (my emphasis) reproduction are impaired" seems to be far more simplistic, rather naïve, and too permissive. Further, McGlone offers that "if welfare is compromised, we should be able to measure changes in health by measuring changes in reproduc-

tive health, immune function or brain function" (p. 31). And, "If one accepts the end point of suppressed physiology as the best measure, then there is no need to measure behavior" (p. 35). McGlone fails to account for the fact that the situations to which animals can be subjected before either survival or reproduction are impaired can include many that would certainly compromise their well-being. Many animals can survive in horrendous conditions that most would characterize as abusive. Furthermore, McGlone ignores the plethora of data that demonstrate clearly that it is possible to get a good grasp on individual animal's points of view about their perceptions of their worlds (see below) and that this information can be a reliable indicator of their well-being. McGlone also claims that there is little difference between "feeling a little poorly" and "feeling hungry (something we all normally feel from time to time)" (p. 26) but he doesn't tell us why this is so. Fortunately, his seems to be the only view among those who have a say about the treatment of nonhuman animals in which the utility of using behavioral criteria for assessing animal feelings and well-being is flatly rejected (see references above and also other essays in Baumgardt and Gray, 1993 and Mench and Stricklin, 1993).

WELL-BEING, DOMESTICATION, FIDELITY, AND CAPTIVE BREEDING:

"Domestic animals are creations of man. They are living artifacts." "They have been bred to docility, tractability, stupidity, and dependency. It is literally meaningless to suggest that they be liberated." Callicott (1980/1989, p. 30)

I begin with the premises that all individuals are morally important and that they should always receive respect in our dealings with them (below I will develop more fully the view that well-being should be naturalized and individualized). Given the broad scope of this meeting, I want to consider a question that often arises in discussions of well-being, namely, "Should wild animals be assigned a different, usually higher, moral status than domestic animals?" Those who maintain that domestic animals do have different claims on our moral responsibilities than do their wild counterparts usually present a more relaxed standard of conduct for domesticated animals. Callicott (1980/1989, p. 30) writes that "Domestic animals are creations of man. They are living artifacts, but artifacts nonetheless, and they constitute yet another mode of the extension of the works of man into the ecosystem"

(see also Katz, 1993). Callicott also believes that domestic animals (all?) have been bred to be stupid, but he gives no indication of what measures he uses and fails to realize that just because animals do things in ways that may seem stupid to us, this is no reason to demean them as they adapt to their own needs and their own worlds. [I would argue that there are no stupid animals, only, perhaps, narrow-minded humans who do not take the time to learn more about the animals who they call stupid. As Szentágothai (1987, p. 323) notes, "There are no 'unintelligent' animals; only careless observations and poorly designed experiments."]

According to Howard (1993, p. 234-235) "Domestic species are genetically programmed to depend upon humans for their safe existence and, fortunately, they always die relatively humanely rather than suffering one of nature's brutal deaths" (for reply see Bekoff and Hettinger, 1994). Since these animals may live longer, have a higher quality of life, and die less painfully than do wild animals (and would not have been born if not wanted), Howard (1993, p. 235) concludes that animal research actually "produces an improvement of life for some individuals of these species" and that "responsible killing of sentient animals can be a sacred act when done in behalf of nature's laws" (Howard, 1994, p. 202; for references to those who take similar views made without any empirical support see Bekoff and Jamieson, 1995). Howard obviously is confused when he equates what he takes to be a "law of nature," nature's (supposed) death ethic, with a moral law about how we should act. Howard (1994, p. 202) also claims that "From a humane point of view, there is no question that the lucky animals are those that are killed by people, whether it be by humane slaughter, a hunter, a car accident, or euthanasia by a humane organization or researcher." Besides the fact that many animals can suffer greatly before dying due to different sorts of human intervention, Howard's unargued assertion can easily lead to the absurd conclusion that if people really want to be humane, we should slaughter all wild-life before they die one of nature's cruel deaths. Greenough (1992, p. 9) goes as far as to claim "In fact, it is very rare for research animals to be subjected to significant amounts of pain. For most animals, life in the laboratory is considerably more comfortable than for their counterparts in the wild." This is a highly dubious claim (see below for further discussion of how appeals to the supposed brutality of nature are used justify how animals are treated by humans, and also Comstock, 1988, for a discussion of where such views might lead). Sagoff (1984, p.

303) claims that "Mother Nature is so cruel to her children she makes Frank Perdue look like a saint." Common use of the words "cruel" and "kind" suggests moral agency (for further discussion of cruelty to animals and moral agency, see Rowan, 1993). But, nature cannot be cruel nor kind (other than metaphorically), as she/he is not a moral agent (see below).

Colwell (1989, p. 33) does not appeal to the brutality of nature to justify the different treatment of domesticated animals. He maintains that "Our moral responsibility for the appropriate care of individual organisms in agriculture, zoos, or gardens does not depend on whether they are wild or domesticated in origin . . ." But, he also writes: "I contend, however, that the role of domesticated species as coevolved members of our ancestral component community . . . places them in a biologically and ethically distinct class from 'wild' species." Colwell's view seems difficult to implement. For it is very difficult to reconcile our having the same moral responsibilities to individuals, regardless of their origins, who, when lumped together with other similar individuals, are then placed in an ethically distinct class. Why does an individual domesticated dog, when viewed as a member of a domesticated species, deserve different consideration than the same individual domesticated dog when considered alone? Certainly, Fido does not suffer less if he is viewed as a member of a class of animals than if he is viewed as an individual. After all, domestic animals can and do experience pain and suffer, and there is no evidence that their pains or sufferings are very different or less than those of at least closely related wild relatives. I doubt that Fido suffers less (or much differently) than a wild wolf after he is bitten in a fight with another dog. If humans have special moral relationships with domesticated individuals, what are they? Perhaps domesticated animals actually suffer more psychologically than their wild counterparts when their expectations are not met in their interactions with humans (Bekoff and Jamieson, 1991). As L. E. Johnson (1991, p. 122) notes: "Certainly it seems like a dirty double-cross to enter into a relationship of trust and affection with any creature that can enter into such a relationship, and then to be a party to its premeditated and premature destruction." This sort of double-cross may undermine our own status as moral agents.

Taylor (1986, pp. 179ff) makes a similar claim in his rule of fidelity for wild animals that states that we should remain faithful to the trust that we bring forth in them, trust that is shown by their behavior, and not

deceive them by misusing this trust. Some field workers, do indeed, believe that the animals who they study come to trust them. For example, Jane Goodall (1994, p. 20) claims that her relationships with the chimpanzees she intensively studied "can best be described as one of mutual trust." Trust and expectations of certain types of behavior on the part of animals are brought forth by the ways in which humans have interacted with them in the past, and not, of course, by some form of mutual agreement. In this sense, trust might be extended to the community of humans and not necessarily to single individuals. Taylor's rule of fidelity also can be applied to our interactions with domesticated animals and other individuals who are not wild, and in fact, there may be more (or at least equally) compelling reasons to apply it more rigorously to companion animals and those individuals in captivity than to wild individuals because the former individuals might have considerably more contact with humans and form close relationships from which some form of trust would be more likely to develop (see below and Bekoff and Jamieson, 1991).

Fidelity and trust are difficult and very important notions, and there is a lot of work to be done in applying and extending Taylor's principle in ways that might be very useful to those interested in individual well-being. For example, possible connections between the notions of trust and deception are complicated. What does it mean to trust another individual, is trust a necessary condition for deception, and are there individual (and perhaps species) differences with respect to possible cognitive components of trusting and being able to be deceived? If trusting suggests at least being able to take something to be the case and being deceived involves having to discover that it is not the case even immediately before an event that breaches trust, then there might be problems in linking trust and deception. For there could be situations in which an individual comes to trust a human(s) and then is deceived without his knowing that it is happening. Is this a case of deception? I think so. If an individual animal does indeed build up a trusting relationship with a human (or humans), and if that human or another human then does something to harm the animal, something new and surprising, then the animal has been deceived whether she knows it or not, and this is, indeed, a double-cross.

Discussions of moral relationships with different types of individuals generates a number of questions that demand close scrutiny. First, we need to know at what point wild individuals become domesticated

individuals. Domestication is an evolutionary process and usually a slow one. Bostock (1993, p. 186) believes that "the well -adjusted zoo animal is slightly domesticated," but this begs the question of when we have a case of domestication. It is important to emphasize that there is a difference between an individual who is socialized and one who is domesticated, although the ability to form social relationships with humans is in many cases important in the process of domestication. A wolf in captivity may be socialized, but does not become domesticated during his lifetime. Assuming for the moment that the ancestors of domestic dogs were wolves and also that some of the effects of domestication can be changed over time (e.g. that de-domestication can occur; for discussion see Daniels and Bekoff, 1989), we also can ask what characteristics of wolves were changed to justify calling wolves dogs, and when is enough of whatever it is to be a wolf lost in captivity so that we no longer have a wolf in captivity, but rather some combination of wolf and domestic dog, say a "dolf": is a wolf in the wolf woods in some zoo no longer a wolf (e.g. Shapiro, 1989; Jamieson, this volume, considers a question that is closely associated, namely is there really a dualism between captive and wild animals, and notes that perhaps the important question is not whether these sorts of views are untenable, but rather what can we learn by making these distinctions)? And if a wolf in the wolf woods in some zoo is no longer a wolf, are we then being fair in telling people that they are viewing a wolf?

It is also important to ask questions such as is being able to hunt for her food as well as starving necessary for a wolf to live a wolf's existence? My and others' ideal of wildness says "yes," but perhaps this is not to be fair to individuals. (Appeals to nature's supposed brutality are relevant here; see below). Comstock's (1988) response to those who claim that because most animal pain occurs in the wild, and because those interested in animal rights must always prevent animal pain they must implement programs including providing contraceptive care so that fewer individuals will suffer in the wild, adopting wild animals as pets, heating dens, punishing cats who eat mice, and turning parks into climate controlled comfort zone, captures the essence of my view. Comstock argues that although events in nature do harm individuals, wild animals have "little interest in being adopted as pets," and that "Even on the strictest utilitarian calculus, being restrained, caged, and intensively managed, would cause wild animals a greater balance of pain over pleasure than freezing to death under normal conditions" (p. 178). Further, he notes it often is very difficult to get formerly wild

individuals to reproduce even in the comforts of captivity.

A related question is "Is it ever justified, and if so under what conditions, to bring wild animals into captivity?" Associated with this question is concern for the well-being of those who have to be killed to feed others in captivity. Bostock (1993, p. 99) notes that killing individuals for food "is regrettable but unavoidable if carnivores are to be kept. As they need meat, there is no additional moral problem in killing chickens or rats or rabbits in a zoo . . ." While he realizes that we do have obligations to these individuals who are to be killed to serve as fuel for others, perhaps having to kill some individuals so that others will live is yet another reason not to maintain certain animals in captivity. Furthermore, there are additional moral problems, for just because carnivores need meat and kill other animals in the wild, this does not justify our killing others for them or our allowing them to kill other animals for food.

The most frequently cited reason for bringing animals into captivity is to preserve endangered species by allowing individuals to live in a protected environment that will facilitate breeding and maintaining the species' gene pool (for a review of some programs see Wiese et al., 1993). It is sometimes said that the goal of these programs is the eventual return of these animals to the wild, to reintroduce them to areas where they once lived before they were exterminated (usually directly or indirectly by humans), or to place them in new areas where it is hoped they will thrive. However, in some cases, as for black rhinos, it appears that keeping animals in small, guarded sanctuaries is the best way to preserve them for return to the wild might be perilous (Berger and Cunningham, 1994).

It is necessary to ask whether or not reintroduction or the perpetuation of endangered species should be our goal and if so, what are we doing to the lives of individuals who we use in these practices. Of course, once animals are taken into captivity or maintained in captivity, we are obligated to provide for their individual well-being and to maintain or restore suitable habitat into which they (or, as is often the case, other members of their species) can be reintroduced. While I am all for reintroduction and the the perpetuation of endangered species in some instances, I do not think that these should be goals that are blindly sought. Rather, the many serious issues, philosophical and practical, that are confronted must be dealt with in an informed way. Further-

more, an appreciation and understanding of the historical aspects of human-animal relationships needs to be factored into policy decisions (e.g. Dunlap, 1988). It may turn out that in some cases it would be wrong to try to regain what was lost. Among the serious philosophical questions involved here are "Do animals have a right to liberty?" "Do species have interests?" "Can the well-being of individuals be sacrificed in the interests of species?" Are individuals better dead than captive bred (Lindburg, 1994)? (For references see Bekoff and Jamieson, 1995, from which part of this discussion is taken.) So that we do not waste limited resources (e.g. time and money) that unfortunately greatly influence our efforts to protect individuals who are endangered, we also need to have precise measures for what it means to be endangered and if and why the situation has arisen; these data are frequently hard to obtain (Hayes, 1991).

It is noteworthy that some of the most virulent critics of captive breeding programs are the scientists themselves who are devoting or have dedicated their lives to these efforts and who sincerely want them to succeed. To quote George Schaller (1993, pp. 233-234): "The realization that the panda has so suffered and declined in numbers while we chronicled its life burdens me painfully. Enthusiasm and goodwill count for little when the enemy is a vast bureaucracy of local officials who myopically use obstruction, evasion, outdated concepts, activity without insight, and other tragic efforts to avoid central-government guidelines and create ecological mismanagement on a dismaying scale." And, with respect to what he calls the "rent-a-panda" program, Schaller writes (p. 249): "The politics and greed, coupled with the shameful indifference to the panda's welfare that has characterized much of the rental business, will not vanish." Peterson (1989) also is skeptical of captive breeding programs, and focuses on the Species Survival Plan for Siberian tigers. He notes that at the time of his writing extant groups of captive Siberian tigers were "poorly distributed in terms of sex ratio and age structure" (p. 301), and that only a few individuals could actually be allowed to breed and that others might have to "be removed—probably killed (or, to use the preferred expression, 'euthanized')" (p. 301). Peterson also stresses that the ultimate goal of most captive breeding programs, the return of endangered animals to the wild, will probably never be attained.

Rabinowitz (1991) also is uncertain about many captive breeding programs because "They provide no comprehensive management of

captive populations and no follow-up programs to reintroduce the young to the wild" (p. 165). Furthermore, he points out that "the proper techniques of reintroduction are rarely used." Schaller (1993) is critical of attempts that entail "rescuing" pandas for purposes of protecting them and developing breeding stock. He notes the deplorable conditions at one research center and explains that "The panda rescue work, a legacy of the 1983 bamboo die-off, continued well into 1987, long after there was any justification for it" (p. 223). He asserts that ". . . if most of those that were rescued after the bamboo die-off were given their liberty they would perhaps replenish the forests" (p. 224). Here there is some tension between rescuing animals who might otherwise have starved to death because of the lack of food, and helping them along so that they might be used to replenish wild populations.

It is important not to deny the extreme importance of the goals of captive breeding programs whose goals go beyond mere breeding. Despite the logistical and financial difficulties with implementing a captive breeding and reintroduction program, Rabinowitz (1991, p. 166) concludes: "No price can be put on saving even a single species that might otherwise have been lost. However, a half-hearted or haphazard and incorrect approach is both a waste of resources and a source of potential harm to the animals involved" (see also Berger, 1994). Given the fact that many experts are extremely skeptical of attaining the goals of captive breeding, specifically for establishing healthy and self-sustaining animal populations that can be successfully reintroduced to the wild, we need to reassess what we are doing and why we are doing it (for related discussion of some problems concerning the persistence of populations and other theoretical and practical issues, see Mangel and Tier, 1994 and Caughley, 1994, and for a discussion of whether or not it is possible to restore natural environments that have been degraded by humans see Elliot 1994). It is not clear that "more is better." Personal attitudes, including human shortsightedness and greed, inform views on this controversial subject (Berger, 1994).

NATURALIZING AND INDIVIDUALIZING THE CONCEPT OF WELL-BEING:

The complex of modalities which may influence pain, perception, and the differences that may occur in individual expression, mean that pain must be evaluated on an individual animal basis." (Rose and

Adams, 1989, pp. 63-64)

“ . . . it is justified to keep animals in captivity for the ultimate benefit of their species—provided their short-term welfare is also attended to.” (Tudge, 1992, p. 29; my emphasis)

By the phrase “naturalizing well-being” I mean that in the best of all possible worlds—and I recognize that this might not be the best of all possible worlds—well-being is at its highest for individuals who are allowed to live their own kinds of natural lives in the wild (or what remains of the wild), as far away as possible from the numerous and pervasive intrusions of humans (e.g. habitat destruction, the introduction of alien species that kill off native species, and sport-hunting). While different criteria for assessments of well-being may have to be used for wild individuals, for wild individuals who are captured and maintained in captivity, for those individuals born in captivity but who would have lived the life of a wild animal if their parents had not been taken captive, for the offspring from frozen zoos, and for domestic animals, naturalizing and individualizing well-being is consistent with attempting to prevent individuals in the wild and those animals in various forms of captivity from being (further) exploited by humans. But regardless of the type of individual involved, it is individual characteristics that count in assessments of well-being and determination of the treatment to which one is exposed, and not the species to which an individual is assigned (Rachels, 1990; Bekoff and Gruen, 1993). As Jamieson (1994) notes, it is misleading to talk about the well-being of a species; it is individual organisms who are the focus of concerns about well-being. For example, sex, age, reproductive status, sensory abilities, motor capacities, and are among those variables that may inform the assessment of an individual’s well-being. I realize that because wild animals often experience pain and suffering in their natural habitats that can be decreased due to human intervention, my naturalized view of well-being can be at odds with positions that stress the importance of preventing harm to individuals (for further discussion see below and also Comstock, 1988). But, we may bring more pain and suffering to individual lives by taking individuals into captivity than by leaving them in the wild, though there may be different sorts of pains and sufferings in each location.

An emphasis on individual differences is consistent with the importance that evolutionary biologists, following Darwin, place on individual variation and differential reproduction. But, many have not

learned the moral lessons that stem from Darwin's views (Rachels, 1990). It is important that individual variation, while difficult to deal with, is not dispensed with as mere noise; normative, say, species-level biology, may have its place in some endeavors, but not, on my view, when questions concerning well-being are at issue. It might be that an individual who is used for a particular purpose, say in a research project, might not be representative of her species' norm. An individual may have been chosen because they are more easily trapped, more tractable, more tame, less healthy, or because of age and sex differences in these or other characteristics. Data collected on a large number of individuals should aid us in establishing some range of what we might call species-typical behavior when and if this information is needed. With respect to how animals are studied, one important aspect of emphasizing individuals is that giving them names, perhaps based on their individual personalities (or "animalities") will also allow us to develop close bonds with them, bonds that many feel are inevitable and bonds that can help us in our research endeavors (for discussion see Davis and Balfour, 1992 and Bekoff, 1994c).

With respect to the fact that cognitive skills are often used in assessments of well-being, it should not surprise anyone that strong interests in the importance of individual differences leads many to be wary about the use of cognitive skills for informing the differential treatment of groups, especially species, of animals. Consider, for example, the phenomenon of what some call "self-awareness" or "self-recognition, a characteristic that often is used in discussions of well-being. Claims that some apes, taken together as different species are able to recognize themselves in mirrors, whereas other apes and monkeys are not (Gallup, 1982; Povinelli, 1993) are certainly premature. In fact, only a few individuals representing different species have been studied, only a few apes have actually mastered the task set before them, only a few monkeys have been tested, and, of great importance, there are many serious methodological and interpretational problems that are still being hotly debated by experts in the field (Rollin, 1989; Platt, Thompson, and Boatright, 1991; Swartz and Evans, 1991; Mitchell, 1993a,b; Heyes 1994; Parker, Mitchell, and Boccia, 1994). As Heyes (1994) notes, the results of primate mirror experiments may not have been subjected to critical scrutiny because they are consistent with assumptions about the evolution of intelligence (for similar discussion about imitation tests see Whiten and Ham, 1992). Heyes concludes (p. 917) that "If similar experiments had been claimed to indicate that clams and toads,

or even cats and monkeys, were unique among non-human animals in possessing a self-concept, then they may have been viewed more critically." Few would disagree that many more data are needed on a wider variety of animals, and few would disagree that we really need to work out just what are the possible connections between the ability to perform self-directed movements in a mirror and the type of treatment to which an individual should be subjected. The important question is whether or not these differences, even if they exist, are morally relevant differences?

Clearly, individualizing well-being raises a lot of important problems. To be sure, it places a burden on those who want to argue that there may be situations when it is permissible to override an individual's well-being for the well-being of another individual or individuals. For example, reintroduction programs are often grounded in our decision to right a wrong—individuals of certain species were treated in such a manner that their species became endangered, and now we decide, for a variety of reasons, to correct this situation by trying to reintroduce individuals to areas where they one lived or by transporting individuals to areas where they can now survive. In order to reintroduce some individuals, other individuals will have to make sacrifices such as being held in captivity. However well-intentioned are the people who want to do this, it is not clear to me that this is a "good" thing to do or if the world will be a "better" place if these sorts of programs are pursued and if some are successful. Certainly, one could argue that it is not a "good" thing to do for any single individual animal whose life would otherwise have continued to be typical of that of her kind. This is not to say that I am against reintroduction studies in all instances, nor that I think that the world would be "better" off if we did not try to help animals in some instances. (The words "good" or "bad" and "better" or "worse" have to be used very carefully in these deliberations, and it is probably better if they are not used at all.) From the fact that I might miss having certain species in the wild, one cannot assume that this makes my life bad or worse for me. Certainly, if some individual's lives have been taken to make other individual's lives possible, then this reduces greatly the possible good that might come out of having survivors back in the wild. Human interests should not be the locus of concern, for first and foremost, we need to think about the animals involved and the worlds in which they live.

My dog, your dog, or the last wolves: "Pets" and partiality. If my

position also commits me to some other views with which I would disagree it is because I have not fleshed out all possible extensions. These are very difficult issues with many unforeseen implications, the discussion of which requires informed interdisciplinary input (Shrader-Frechette and McCoy, 1993, 1994a,b; Hettinger, 1994). For example, Ned Hettinger often asks me the following question, one that entails serious consideration of many of the issues being discussed in my paper and at this conference: If I am driving my car down the road and either have to hit and instantaneously kill the last wolf on earth or my companion dog, Jethro, who would I choose to kill? (He also presses me with the question of who should I kill and my answer doesn't change given my relationship with Jethro.) My answer always is that I would choose to kill the last wolf. Nonetheless, I often ask myself, am I wrong to make this choice even after thinking about it, am I too self-centered, what about the fact that there are many other dogs but there will then be no future wolves? Regardless, there also will never be another Jethro; he is a special friend, he is near and dear to me, and he means more to me than any other animal, including the last wolf (who if not pregnant, will never produce more wolves anyway). This friendship makes it impossible for me to be impartial (see also Jackson, 1991 and Friedman, 1993). Of course, there are many questions that require further discussion beyond this essay, such as what if the last wolf was, indeed, pregnant, or what if there was a group of wolves, or what if the choice involved another domestic dog who I did not know. My answer remains that I would still choose to save Jethro's life. While, I am really not sure what I would do if Jethro was not involved, but rather another dog, if the dog was one who I knew, and I also knew that she had a caring human looking after her, then I might very well spare the dog. These really are difficult issues with seemingly endless routes and destinations! An extension of Taylor's (1986, pp. 179ff) rule of fidelity might help us here (see above), although he is an impartialist. Also, consideration of the literature on friendship and partiality in moral decisions would be useful (e.g. Fried, 1970; Blum, 1980; Badhwar, 1993; Friedman, 1993) for many similar questions are raised.

Interference and appeals to nature's supposed brutality: Now, what about other types of interference in the lives of wild animals (for further discussion see Sapontzis, 1984, 1987; Taylor, 1986, pp. 173ff; Rolston, 1988)? While they may be confronted with situations that bring them pain and suffering such as disease, predation, and aggres-

sion, except in unusual circumstances (see below for some possible examples and also Taylor, 1986, pp. 173ff, 264ff) wild animals should not be interfered with. According to Taylor's (1986, pp. 173ff) "rule of noninterference," humans have a duty "to let wild creatures live out their lives in freedom" (p. 174) because intrusions into "the domain of the natural world . . . terminates an organism's existence as a wild creature" (p. 175). While it may seem that a wolf in captivity is better off than a wolf in the wild who is starving, starving due not to human interference but because of natural cycles of prey or because she is a subordinate individual, once even a starving wolf is brought into captivity she remains a wolf only in name—she is no longer a wolf in the sense of a being who lives a typical wolf's life. Also, we may bring more pain and suffering to their lives by taking them into captivity than they would endure in the wild—though there may be different sorts of pains and sufferings in each location. I don't think we have to be do not have to be apologists for nature. Thus, for example, we should not accept Howard's (1993, 1994) claim that the quality of animal lives is superior in human culture than in wild nature. For example, with rare exceptions the life of a tiger is not improved by putting him in a zoo. Although his food will be provided for him, hunting has played a large role in the evolution of tigers and is essential to a tiger's way of life. His movement will also be severely restricted, and for animals who typically roam in search of food and shelter, captivity produces an impoverished existence. Furthermore, it is not at all clear that captive animals live longer than their wild counterparts or that they are healthier. Leigh (1994) reports that captive and wild anthropoid apes show considerable overlap in weight, and that there is a greater risk for captive males to suffer from obesity when compared to wild counterparts.

Kirkwood (1992) presents a thoughtful essay on the well-being of wild animals and considers questions such as whether we should intervene on behalf of free-living wild animals, and if so, to what extent and how it should be done. While he acknowledges that there are many different views on the matter, he claims that "Most would probably agree that when wild animals are harmed by man's very recent (in evolutionary terms) changes to the environment (such as oils-spills, power lines, roads, and environmental contamination) there is a reasonable case, on welfare grounds, to intervene" (p. 143). Kirkwood also writes about veterinary intervention to treat injured or sick wild animals. He correctly calls for "an international code on intervention for wildlife

welfare to provide guidance on ethics, methods and standards" (p. 151). While I cannot explore these issues in depth, I do believe that there are circumstances in which humans may have to intervene in the lives of wild animals, including some of those listed above (see also Schaller, 1993). One also needs to give serious consideration to the idea that if any experimental manipulation, including the mere presence of researchers, leads to harm for either the target animal or (indirectly) for any individual, then we have the obligation to intervene on the animals' behalf.

Further discussion is also needed concerning if and how appeals to the "ways of nature" bear on the morality of human treatment of other animals (Hettinger, 1994; Bekoff and Jamieson, 1995). Inferring what we should do from how nature acts is logically troubling, and superficial appeals to nature's brutality to justify the treatment of nonhumans (e.g., Grandin, 1992; Greenough, 1992; Lansdell, 1988) will not do. Crick (1994, p. 110) claims that "it is sentimental to idealize animals" and merely asserts that life in captivity is better (longer and less brutal) for many animals than is life in the wild. Even more informed philosophical stances (Rolston, 1989, p. 59) remain unconvincing. Rolston claims that "The wild animal has no right or welfare claim to have from humans a kinder treatment than in nonhuman nature." But he also notes that nature is not a moral agent and neither are animals—"Even an alligator that eats humans is not being unfair or unjust . . ." (p. 81). [Along these lines, it should be noted that a rare white Bengal tiger who recently killed a zookeeper at the Miami, Florida zoo, was not destroyed because "the tiger was just being a tiger" (Rocky Mountain News, 7 June, 1994, p. 3A).] Here, we need to ask, who, if anyone, is being unkind in, say, a predatory encounter? Perhaps Rolston would have been more correct to use the word "better" rather than "kinder." Neither predators nor hurricanes are kind, but animals can be treated better or worse by predators or by hurricanes. Indeed, if we were to think of some animals as moral agents, we need to ask what sorts of capacities we would be attributing to them and how their possession would in turn influence our treatment of them. Further, do we really want an ethic that sanctions the treatment of animals by humans as long as it is better than what nature typically has in store for similar individuals? I think not.

Another important and related question that arises frequently is whether human-caused pain in animals is less than or equal to what

the animal would experience in the wild, and if so, is it then permissible to inflict the pain? For many animals it is difficult to know whether human-caused pain in animals is less than or equal to what the animal would experience in the wild, for we do not know how most individual animals in nature experience pain. Melodramatic claims such as Sagoff's in which Frank Perdue's cruelty is compared to that of Mother Nature's are vacuous; they just don't seem to have any force because of differences in moral agency between Mr. Perdue and Ms. Nature (but see Hettinger, 1994). We must be careful that appeals to nature's supposed cruelty are not just rationalizations for researchers doing what they really want to do on other grounds. They just might be caught in what Arluke (1993) calls a "guilt cage."

What principles should we use as ethical guides? It seems that there needs to be more than one principle guiding our treatment of other animals given their diversity and given the variability of the situations in which we find ourselves confronting them: animals in the wild are different from animals who were once wild and are now in captivity (although not all animals in the wild or in captivity are the same), animals who were born in captivity and then placed back into the wild are different from animals were born in the wild and remain there, domesticated individuals are certainly different from their wild relatives but the differences do not mandate differences in favoring wild animals. Most importantly, there are differences among individuals who are members of the same species, variations that seem more important in influencing how individuals are to be treated than are differences between animals who belong to different species. While it might sound "nice" (or correct) to proclaim that we should always reduce animal pain and suffering when we can, not only is this impractical, but as a guiding principle I find it to be one that is far too intrusive on animals in the wild who are able to live lives typical of their species, lives that might include being eaten, dominated, and gravely ill (see also Comstock, 1988). Even if there are some instances in which we can justify our intrusion to relieve pain and suffering, deciding when it is appropriate to do so makes for terribly difficult decisions, and consistency among different people would certainly be unachievable in terms of the circumstances in which they think they are justified in relieving pain and the species for which they show greatest concern. Personal views will certainly prevail—personal values are impossible to dispense with. Perhaps we should marvel at nature and not think that we can or should fix all of what some may

call nature's "wrongs." There is only so much that we can do and there seems to be no reason to expect that just because we could do something, we ought to do it. Furthermore, we must realize that for many or most of our intrusive activities, some individuals will benefit while others will not; we simply cannot please every individual even if wish to do so.

One important question concerns if and how human interests in individuals and species can be brought together in a practical way that also is not narrowly prescriptive, such as, for example, speciesism may be (Singer, 1979; Ryder, 1992; Varner, 1994a,b; Donnelley, 1995; also see essays in Hargrove, 1992 and Zimmerman et al., 1993). Ryder (1992) offers the notion of painism, "the desire to reduce individual suffering in whatever creatures it happens to occur, human or nonhuman, terrestrial or alien, natural or artificial" (p. 14), as a substitute for anthropocentric speciesism and as a motivation for a view of environmentalism that is closely aligned with animal welfarists' (usual) concern for individual's well-being. Certainly, the broadly applicable of painism may be more difficult to override than is speciesism. However, individual-based painism does not mandate trading-off individuals for species, a trade-off that might be justified by appealing to some combination of utilitarianism, anthropocentrism, and biocentrism. Thus, Ryder (1992, pp. 14-15) writes: "The conservation of a species may also be important because the awareness of the existence of that species will give pleasure, in the future, to individuals members of our own species. Furthermore, that species's continuation may help maintain the so-called balance of nature, and have little-understood and currently incalculable benefits for innumerable painient individuals of many species." Certainly, species are important, and they cannot be ignored (Midgley 1983; Ryder, 1992). But, even if it was possible to argue that in some cases species should be given preference to individuals, then deciding on what criteria to use presents very difficult problems. Using scales of life, intelligence (or stupidity), or the importance of individuality and sociality (Midgley, 1992) to differentiate among species is appealing, but presents many problems (Bekoff, 1992; see below).

Peter, Paul, and Mary: Many principles have been proposed that perhaps could guide us in our treatment of animals: utilitarian ones, rights-based ones, interests-based ones, and so forth. Using Peter, Paul, and Mary (Singer, Taylor, and Midgley, not Peter Carruthers nor

Peter Harrison) as our guides, and expanding their views, seems a good idea, though, of course, all have their critics. Scientists often operate on the basis of implicit principles and guidelines that are often not discussed. All of these principles need to be brought out into the open and explicitly debated. First and foremost in any deliberations about other animals must be deep concern and respect for their lives and for the worlds within which they live—respect for who they are in their worlds, and not respect motivated by who we want them to be in our anthropocentric scheme of things (see also Westra's, 1994 important discussion of integrity). As Taylor (1986, p. 313) notes, a switch away from anthropocentrism to biocentrism, in which human superiority comes under critical scrutiny, "may require a profound moral reorientation." So be it.

COGNITIVE ETHOLOGY AND ANIMAL WELL-BEING" A BRIEF OVERVIEW

"Also, animals do not suffer as much mental trauma as people." (Howard, 1994, p. 204)

"If animals are to be denied reason (*logos*), and with it belief (*doxa*), then their perceptual content must be compensatingly expanded, to enable them to find their way around in the world." (Sorabji, 1993, p. 7) Here I specifically and briefly address how cognitive ethology, the comparative and evolutionary study of cognition, consciousness, and the workings of animal minds, can inform discussions about animal well-being. As DeGrazia (1995) stresses: "Taking animals seriously requires taking their mental lives seriously." This topic has recently been reviewed in Bekoff (1994b), and the reader is directed to this paper from which much of this discussion is taken, and also to Cavalieri and Singer (1993), Bekoff and Allen (1995), DeGrazia (1995), and Masson and McCarthy (1995) for more detailed arguments and numerous references. Naturalizing and individualizing animal minds means that I favor studies of animal cognition in conditions that most closely resemble those in which individuals have evolved or in which they currently reside in nature. After a few prefatory comments, I will limit myself here to discussing what may be called "not so cognitive" individuals.

Sentience and cognition: Cognitive ethological investigations are relevant to animal well-being even if cognition and consciousness are

conceptually distinct phenomena. While there are occasions on which animals, including humans, who are able to be aware of their own and other's behavior and of their surroundings are not conscious of their own or other's behavior or of their surroundings but yet appear to process information, there are also situations in which certain cognitive abilities such as the attribution of mental states to others are difficult to explain without invoking consciousness (Humphrey, 1976; Byrne and Whiten, 1988; Cheney and Seyfarth, 1990, 1992; Griffin, 1992; Dawkins, 1993).

At the start, I would like to make one thought clear—despite the close connection between cognitive ethology and animal well-being, following Bentham (1789/1948), the fundamental question that remains “is not Can they reason? nor Can they talk? but, Can they suffer?” On this account, an individual's ability to experience pain (defined as a heterogeneous category of unpleasant sensory or emotional experiences of which the individual is aware; see Rose and Adams, 1989; Bateson, 1991, DeGrazia and Rowan, 1991; and Orlans, 1993 for further discussion) or to suffer (to show unpleasant emotional responses to more than minimal pain or distress; see DeGrazia and Rowan, 1991) or to experience anxiety that may threaten one's well-being (DeGrazia and Rowan, 1991) provide more compelling reasons to grant her moral status and to treat her with respect than does her ability to perform actions that demand cognitive explanations—that she has memories of past events, is aware of her surroundings, has the ability to think about things that are absent, or can have beliefs or desires and be able to make future plans. This point needs to be stressed because at least at the moment it seems impossible to come up with any rigorous criteria that lead to the conclusion that specific cognitive abilities are morally relevant or should be valued more than others, that variations in cognitive abilities among nonhumans or between nonhumans and humans make a difference in how individuals should be treated by humans (Johnson, 1983; see also R. and V. Routley, 1979). Certainly, nonhuman animals are different than human animals, but nonhumans can also be uniquely different from one another, and it is not at all clear that these differences must make a difference in the moral arena. It also is important to note that an animal can suffer without feeling any physical sort of pain—anticipation of what is likely to happen can produce suffering (see above and Adams and Rose, 1989).

There are many good reasons for adopting Bentham's position (Singer,

1990, Bowd and Shapiro, 1993), especially because of the strength of subjective assessments of how the behavior of individuals should inform decisions about their treatment (Bateson, 1991; Fraser, 1993; Mason and Mendl 1993; Wemelsfelder, 1993; see also Broom, 1993). Despite the emphasis on sentience rather than on individual cognitive abilities in assessments of well-being, it still is important to learn about animal behavior and animal cognition, for knowledge in this area will help to inform and motivate analyses of what types of situations, social and otherwise, might lead to pain, suffering, boredom, or frustration and how they may be prevented (Rollin, 1981/1992, 1989; Mineka and Cook, 1988; Snowdon, 1989; Bateson, 1991; Dawkins, 1990; Duncan and Poole, 1990; Singer, 1990; Bekoff and Jamieson, 1991; Duncan and Petherick, 1991; Mason, 1991a,b, 1994a,b; Fagen, 1992; Broom, and Johnson, 1993; Carlstead, Brown, and Strawn, 1993; Fraser, 1993; Jensen and Toates, 1993; Lawrence and Rushen, 1993; Terlouw, 1993; Wemelsfelder, 1993; Gibbons et al., 1994; Masson and McCarthy, 1995; but see McGlone, 1993). The work of Mason (1991a,b, 1994a,b) on stereotyped behavior stands out as an example of what needs to be done, in the theoretical and practical arenas, for stereotypes are frequently used in assessments of well-being but we really know little about them and generalizations across species are often specious. Those who study behavior and behavioral ecology in the field are in a good position to make important contributions to animal well-being, although unfortunately they often play only a minor role in informing legislation on matters of animal well-being (Cuthill 1991). Field workers can help to provide guidelines concerning dietary requirements, space needs, the type of captive habitat that would be the most conducive to maintaining the natural activity budgets of the animals being held captive, information on social needs in terms of group size and age and sex composition, and information about the nature of the bonds that are formed between animals and human researchers.

Comparative analyses of sentience and cognition: More comparative data on animal cognition in a wide variety of individuals belonging to different taxa, especially those with which we are least familiar and those with which we do not identify. While Duncan (1993b, p. 8) believes that "it is only appropriate to consider the welfare of sentient animals such as vertebrates and higher invertebrates" (but he does not devalue "lower invertebrates"; see also Kellert, 1993), I propose that we expand our studies to include as many invertebrates as possible because of the possibility of learning about the evolution of sentience

and the existence of different types of cognitive skills (see also Lockwood, 1987); we should not be speciesistic cognitivists. Certainly, broad comparative and phylogenetic studies of sentience and cognition would be helpful in our attempts to draw lines and to avoid slippery slopes concerning their presence or absence (or their possible continuity), a matter that Duncan (1993b, p. 9) admits “is still open to debate” at least with respect to sentience despite his placing phylogenetic limits on our concerns about well-being. As Orlans (1993, p. 152) points out, there is a lot of uncertainty concerning the phylogenetic distribution of pain and suffering, and there is a trend to include species “lower on the phylogenetic scale, and this trend appears likely to continue.” Such studies will also be helpful for stressing that the word “animal” refers to individuals other than only “mentally normal mammals of a year or more” (Regan, 1983, p. 78). While Regan fully acknowledges that he is using the word in this limited sense for economy of expression, and he notes that “important moral constraints also apply to our dealings with other animals . . . ” (p. 78), this extremely narrow (but qualified) use of the word “animal” can divert attention from the diversity of organisms with whom we share this planet and about many of whom we know little or nothing. Furthermore, Regan ignores the incredible amount of variation among different mammals at one year of age. All one-year old mammals are not at the same comparable level of development (G. Mason, personal communication).

Although data on sentience and cognition—the subjective worlds of animals—are open to question because of the impossibility of ever knowing precisely what it is like to be another individual (Mason and Mendl, 1993), many rejections of the possibility of learning about animal sentience and cognition are based on an ignorance of available empirical data, the adoption of double-standards that require more rigorous scientific evidence for animal consciousness and animal cognition than are demanded for other scientific endeavors in which imprecision also abounds, a rejection of the use of anthropomorphic and anecdotal explanations, even their heuristic value, or are based on contentious philosophical issues. [Of course, many reports of animals’ responses to novel situations that are often used to make claims about cognitive abilities, are anecdotal, in that they are not repeatable and unquantifiable (DeGrazia, 1995). This is a problem for those who reject outright the use of anecdote (Bekoff, Townsend, and Jamieson, 1994).] As Marian Dawkins (1990, p. 1) notes: “Let us not mince words:

Animal welfare involves the subjective feelings of animals." Thus, because cognitive ethologists do research that includes the study of subjective feelings in animals, it is important to know what cognitive ethologists do and something about the sources of resistance and support of cognitive ethology before relationships between animal minds and animal well-being can be discussed in an informed manner. Some interests of cognitive ethologists: Cognitive ethologists are generally interested in evolutionary and comparative studies of thought processes, consciousness, beliefs, and rationality in animals. They emphasize broad rather than narrow taxonomic comparisons and favor observations and experiments in conditions that are as close as possible to the natural environment where selection has occurred or in the habitats in which individuals currently reside; field studies of animals that include careful observation and experimentation can inform studies of animal cognition, and cognitive ethology will not have to be brought into the laboratory to make it respectable. Careful attention is also given to the animals' own perceptual worlds, or *umwelts*. The major problems that cognitive ethology faces are those that center on methods of data collection and analysis, and on the description, interpretation, and explanation of behavior (Bekoff and Jamieson, 1990, Jamieson and Bekoff, 1993). Cognitive psychologists, in contrast to cognitive ethologists, typically work on related topics in laboratory settings, and do not emphasize comparative or evolutionary aspects of animal cognition. When cognitive psychologists do make cross-species comparisons, they are generally interested in explaining different behavior patterns in terms of common underlying mechanisms. Ethologists, in common with other biologists, are often more concerned with the diversity of solutions that individuals have found for common problems.

Given their interest in the evolution of cognition, and following Charles Darwin's lead, cognitive ethologists (and many others) also pay attention to mental continuity between humans and other animals. For example, evolutionary biologists talk about the continuous evolution of organs such as hearts, lungs, kidneys, stomachs, and even brains. If brains are associated in some way with minds and thinking, then there is something to be gained by looking at possible continuity between human and animal minds and human and animal thinking. Can we really believe that humans are the only individuals with feelings, beliefs, desires, goals, expectations, or the ability to think about things? Of course, this view does not mean that there is continuity

between all taxa, but it does mean that it would be wrong to look at continuity between structure and function in some systems and not in others. As Bateson (1991, p. 830) stresses, "it would be as irresponsible as it would be illogical to suggest that because continuities might not be found, they do not exist." Some go as far to suggest that the well-being of humans depends on our not becoming further estranged from the natural world (see many chapters in Kellert and Wilson, 1993).

Issues about continuity can become important in discussions of well-being. For example, by wrongly concluding that there are "higher" and "lower" species that are, respectively, conscious and unconscious (see Sacks, 1992), the way is paved for unjustified differential treatment. Indeed, the words "higher" and "lower" have fallen from grace among most scientists because they are far too difficult to define in any useful (or nonarbitrary or circular) way. R. and V. Routley (1979) have argued against the inevitability of human chauvinism, that humans should place themselves in some moral arena apart from, and above, nonhumans. They analyzed over 30 characteristics (e.g. tool use, the ability to use and learn language, having a sense of shame, possession of consciousness, having a mental life, having interests, belonging to a social community) that often are used for justifying human chauvinism and showed why they fail for at least one of three reasons, including they are not "possessed by at least all properly functioning humans" (p. 39), they are possessed by some nonhumans, and they are not "sufficient to justify, in a non-circular way, the cut-off of moral consideration at exactly the right point . . . There must be some explanatory logical connection between the set of characteristics and membership of the Moral Club" (p. 40).

Clearly, cognitive ethology can inform questions concerning animal-well being that center on consciousness, beliefs about and of things (intentional behavior), self-awareness, self-recognition, the evolution of cognitive skills, the importance of studying the social and the perceptual worlds (ümwelts) of the animals themselves, pain, suffering, and the importance of individual differences in decisions about well-being (Bekoff and Jamieson, 1991, Bekoff, 1993; Dawkins, 1993). Many who were silent in the past are paying more and more attention to ways in which the matters of mind inform matters of well-being (e.g. Dennett, 1991, pp. 448-454; Griffin, 1992, p. 251, many chapters in Cavalieri and Singer, 1993). Indeed, Griffin (1992) considers ethics to be one of three major reasons to study animal mentality, the other two being philo-

sophical and scientific. He also claims (p. 251) that "thoughtless cruelty is prevalent in some circles", but unfortunately does not tell us where. Byrne (1991, p. 47) goes as far as to claim that "If explorations of the minds of chimpanzees and other animals do nothing more than inform the debate about the ethics of animal use in research, the work will have been well worthwhile."

It is essential that people who espouse positions on how animal cognition informs their views on animal well-being understand the theory and data from which they are drawing their conclusions; unfortunately, this is not always the case for some biologists (e.g. Howard, 1993, 1994) or some philosophers (e.g. Carruthers, 1989, 1992; Harrison, 1991; Leahy, 1991; for discussion see E. Johnson, 1991; Jamieson and Bekoff, 1992b; Pluhar, 1993a,b; Bekoff and Hettinger, 1994; Kirk, 1994). For example, Leahy (1991) believes that one does not have to watch animals in order to learn about them (for review see Singer, 1992), and Harrison (1991) claims that pain has no survival value (but see Bateson, 1991 and Pluhar, 1993a,b). Carruthers (1989, p. 265) asserts that "no one would seriously maintain that dogs, cats, sheep, cattle, pigs, or chickens would consciously think things to themselves," and that the experience of most nonhuman animals is nonconscious. Because only conscious experience is morally significant and because most animals have only nonconscious experience, it follows that the experience of most animals is without moral significance. Nonetheless, Carruthers does believe that many animals may experience pain and pleasure, and have beliefs, desires, and intentions, and yet be entirely nonconscious. Carruthers' thoughts seem incoherent (Jamieson & Bekoff 1992a, Pluhar 1993a). He presents no rational grounds for eradicating our moral sympathies for brutes, and subsequently he has become less strident about his former position: "I shall by-pass the position defended in Chapter 8, that the mental states of animals are non-conscious ones. For this is, at the moment, too highly speculative to serve as a secure basis for moral practice" (Carruthers, 1992, p. 194).

THE "NOT SO COGNITIVE" INDIVIDUAL

If individual cognitive capacities are used for drawing lines along some arbitrary scale concerning what can and cannot be done to them, granting that an individual is conscious or capable of behaving intentionally and having thoughts about the future (for example) can greatly influence the treatment to which he is subjected. Using the

word “stupid” to refer to domesticated animals (Callicott, 1980/1989, p. 30) when compared to their wild relatives, can certainly inform how one treats an individual.

What might be some of the implications of discovering that some animals are “not all that cognitive”—that they have relatively impoverished cognitive abilities and lives or that they have fewer memories and fewer beliefs about the future? First, we would have to show that these so-called cognitive “deficiencies” are morally relevant. Some may want to argue that having a more impoverished life might be a morally relevant difference, but they can’t have it both ways. If some individual’s—human and nonhuman—cognitive lives are not as rich as other “more cognitive” individuals, the limited number of memories and expectations that the former individuals have may each be more important to them. Not allowing certain expectations to be realized is a serious intrusion on their lives, perhaps more serious than not allowing some expectations in animals with richer cognitive lives to be realized. As Mendl (personal communication) notes, an animal with relatively undeveloped cognitive ability may not learn that she is to be fed at a certain time, and may spend the whole day dominated by feelings of intense hunger and anxiety for she cannot understand that she will eventually be fed; here too is an instance of where there may be suffering with no adverse physical pain.

Furthermore, as some have argued, if the memories of some animals are not well-developed so that they live in the present and do not have the ability to know about the passage of time into the future, then their pains have no foreseeable end. Thus, I might know that my companion Jethro’s pain might end in 5 seconds, but he cannot know this on this account. Even if his sense of time is impoverished in comparison with that of a normal human, there don’t seem to be any well-thought out arguments for the idea that animals totally lack a sense of time. They may only have notions of then, now, and later as evidenced by their reliance on past events (learning) to inform what they are now doing, and the performance of behavior patterns including building nests and caching food for future use, but they do have some sense of time. While it may be the case that some individuals experience a fear of future events, and this ability to anticipate the future is linked somehow to their cognitive abilities, even if not-so-cognitive individuals cannot do this, a balance of some sorts is reached because they may not be able to know when something to which they are currently exposed

will end.

Related to this line of reasoning is the observation that many animals, even those for whom we would be hard-pressed to suggest a rich cognitive life (e.g. a lobster), take what are called self-regarding steps (Hannay, 1990, pp. 154ff); they seem to try to remove themselves from situations that they find aversive, situations that resemble those that normal human beings and other animals find aversive. Even if they do not imagine that there is something that is more pleasurable, and even if they are (some might say merely) removing themselves from a situation that is aversive, they seem to be showing some indication of displeasure and pain. Not being able to imagine a cooler future does not mean that they are not in pain when they are dropped into hot water. They are acting as if they do not like the situation in which they find themselves and they may be trying to remove themselves from it without having a subjective experience of pain or a thought about the future. Georgia Mason (1994, pp. 57-58) points out that there seems to be no good reason why self-awareness needs to be as a prerequisite for suffering, why "the (self aware) feeling 'I am suffering' [should] be considered worse than the (not self aware) 'Something truly terrible is happening'" [for further discussion of some of these issues see Papineau (1993, chapter 4, especially pp. 116ff)].

Having a preference for cool water rather than hot water and having a preference to live are clearly different. Along these lines, DeGrazia (1991) claims that if a struggle for survival is not accompanied by a particular mental state, then it fails to reveal a preference to live. This claim forces the following issue: We must be sure that there is not a particular mental state, perhaps a mental state with which we are unfamiliar, that informs a preference shown by an animal who we think is "not all that cognitive", and we must remember that this remains largely an empirical question. It is possible that some animals experience pain and suffer in ways that we cannot yet imagine, and it would be wrong now to conclude that their responses to various stimuli do not count in decisions about their well-being, that they are similar to the various tropisms shown by plants. It is definitely possible that others who act nothing like we do when we feel pain nevertheless really do feel pain (Lewis, 1980; see also Papineau, 1993, pp. 131ff). Despite their shortcomings (Duncan, 1992, 1993), it is possible that preference tests that are developed for a broad spectrum of animals would help to shed some light on the phylogenetic distribution of

sentience (remembering also that possible relationships between sentience and the having of preferences are complicated; Varner, 1990; Kaufman, 1994). This is a challenge for the future because when animals do not do what we expect them to do or when they do nothing, it is possible that they are not motivated by the situation that we create—there are as yet unknown factors that influence their behavior (Rozin, 1976; Gallistel, 1980; Cheney and Seyfarth, 1993; Enç 1994).

SOME CONCLUSIONS: WHERE TO FROM HERE?

“If we conclude that chimpanzees are conscious, we must then confront the ethics of our treatment of such animals in captivity and in the remaining wild.” (Jolly, 1991, p. 231)

“We take from them their freedom, their health, and often their lives. Surely the least we can do is try to provide them with some of the things that could make their imprisonment more bearable.” (Goodall, 1987, p. 577)

“It don’t make no sense that common sense don’t make no sense no more.” (John Prine, 1975)

What do people interested in animal well-being need from cognitive ethologists? Details can be found in Bekoff (1994b), but here are some suggestions. More data are needed. Broadly comparative studies emphasizing individuals in applied cognitive ethological analyses will be especially important. This will mean going beyond animals who look like humans or act like humans, extending our data base beyond those species with which we are most familiar, and thinking about the different sensory worlds of animals in which vision is not of great importance. Furthermore, we should not let how an animal looks inform whether or not she is in pain or suffering; we should not make these judgements by vision alone (Bekoff, 1976). This will also mean developing an empathic feeling for the animals being studied (e.g. Moore and Hannon, 1993). Of course, we should be careful to note that data that bear on cognitive abilities may have little to do with pain and suffering. We also need to limit the number of animal who are used, but unfortunately, this apparently has not happened in studies of behavior (McConway, 1992; but see Hilts, 1994).

While the desire to learn as much as we can about the behavior of non-

humans is laudable, studying animals in the laboratory and in the field intervenes in their lives, no matter how careful we are to tread lightly. Trapping animals, marking animals, doing playback experiments, and changing the size and composition of social groups, for example, can be extremely disruptive, and the highest of ethical principles must be adhered to in our efforts. That field biologists are concerned is reflected both in the published guidelines of many professional societies and in the practices of some field biologists (see, for example, Rollin, 1989; Bekoff et al., 1992; Bekoff, 1993, 1994d; Bekoff and Hettinger, 1994; Clutton-Brock, 1994, p. 33; Laurenson and Caro, 1994). Field researchers are able to study the behavioral effects of the techniques that are used to study wild animals to determine if there are behavioral changes that might influence the validity of the data that are collected (Bekoff, 1994d; Laurenson and Caro, 1994), and their subsequent use or misuse in decisions about how individuals are treated. In some cases it might be impossible to justify the costs of doing what needs to be done, and suitable alternatives will have to be developed or some research questions might have to go unanswered for the time being. (On my campus, many people were greatly disturbed because prairie dogs were killed so that a greenhouse could be built; Hilliard, 1992.)

Careless and premature line-drawing, especially for generalizations about the behavior of species should be discouraged. With respect to cognitive abilities, it also needs to be decided if there are morally relevant differences in cognition and, if so, why we think this is the case. DeGrazia (1991) and Rachels (1990) emphasize, a difference between individuals that justifies one sort of difference in treatment might be irrelevant in justifying another difference in treatment.

For me and some others, the bottom line is that when uncertain about the possibility of an individual's sentience, we should err on her side. Dennett (1991, pp. 451-452) agrees, but is more guarded. He writes:

But in the absence of positive grounds for imputing suffering, or positive grounds for suspecting that such positive grounds are for one reason or another systematically concealed, we should conclude that there is no suffering.

We need not fear that this austere rule will lead us to slight our fellow creatures. It still provides ample ground for positive conclusions: Many, but not all, animals are capable of significant degrees of suffer-

ing. A more persuasive case in support of humane treatment can be mounted by acknowledging the vast differences in degrees, than by piously promulgating an unsupportable dogma about the universality and equality of animal pain."

Some possible problems with this perspective include questions such as: (1) What are "positive grounds for imputing suffering" or for suspecting that they are concealed? (2) What is a "significant degree of suffering"? (3) How can we measure differences in degrees of suffering and are they morally relevant?

David Hardy (1990, p. 11) has concluded that a detailed exploration of problems associated with animal well-being "... must be consigned to those who have independent sources of wealth, no family obligations, and a lamented shortage of concrete worries." I disagree: everyone needs to be concerned with the treatment to which nonhumans are subjected. We must not only think of the animals when it is convenient for us to do so. Although the issues are at once difficult, frightening, and challenging, this does not mean they are impossible with which to deal. Certainly we cannot let the animals suffer because of our inability to come to terms with difficult issues. While some countries are devoting a lot of effort to applied ethological studies that center on issues of animal well-being, others, including the United States, seem to be lagging behind (Duncan, 1993a; see also Gavaghan, 1992).

In our deliberations about animal well-being and animal welfare, we must not forget that humans and other animals are all part of the same world, and that humans and animals are deeply connected at many levels of interaction. When things go awry in our interactions with animals, as they surely will, and animals are set apart from and inevitably below humans, it seems certain that we will miss the animals more than the animal survivors will miss us. In many cases our intuitions are reliable guides; we don't need to be an Albert—Einstein or Schweitzer—to know that normal dogs, cats, wolves, monkeys, great apes, dolphins, rats, robins, goldfish, snakes, lizards, and many other animals, including many invertebrates, experience pain and are able to suffer as a result of different forms of human intervention. Anecdotes, anthropomorphism, common sense, sympathy and compassion, and hard scientific data all have an important place in our deliberations about the animals for whom we speak; none, taken alone, including science (Tarnas, 1991, pp. 354ff, Dupré, 1993), can deliver. This is not to be anti-science, for questioning science will make for better and more

responsible science (e.g. Rose, 1992; Farnsworth and Rosovsky, 1993; Berger, 1994), and lessen the chance that mistakes of the past will be revisited.

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BEKOFF DISCUSSION

Rowan: Wittgenstein said that if lions could speak we would not be able to understand them. Do you agree or disagree with that statement?

Bekoff: I think lions can and do speak, but they speak "lionese" rather than English. Lions can tell us a lot about what they are feeling. I think we can have a general understanding of what it is they are trying to convey. Therefore I generally disagree with Wittgenstein's statement, because I think the word "speak" is not appropriate. Perhaps communication would be a better choice.

Rowan: It seems to me to be an important issue in terms of what one believes about the cognitive quality of an animal's life. Wittgenstein seems to be saying that they are so different from us that we could not develop any sort of emphatic connection of communication with them.

Bekoff: I think that is a wrong assessment. Through watching or interacting with animals it is possible to connect with them.

Lewis: I found Bekoff's paper to be incredibly rich. If I were to respond to every point that deserves response we would be here all day, therefore I have confined myself to points that I and other animal protection people and organizations feel are important in judging an animal's well-being.

The first is the naturalizing and individualizing definition of well-being, a definition which expressed my feelings in a much more articulate way than I had been able. Bekoff's definition states that an animal should be able to live its natural life in the wild as far away from human intrusion as possible. In many cases this is not feasible, but is certainly an ideal for which we should strive. I find that to be a good working definition of what "wildness" is, for autonomy is an essential part of wildness. Bringing a wild animal into captivity and not allowing it to make its own decisions does not make it a different animal, but decreases its wildness in some way.

Human interest should not be the focus of concern with animals. We need to have concern and respect for who animals are in their own

world, not for who we want or wish them to be or what they signify to us. It is more intellectually honest to look at them as they are and try to understand who they are in their own world.

Animals definitely possess cognitive ability. Anyone observing animals can see that they possess this ability. The history of our relationship with animals has been discovering that they have abilities that we did not think they possessed; use of tools, forming societies, organized behavior, etc. We need to explore these cognitive abilities in order to better understand the impact we have on animals when we have them in captivity so that we may prevent suffering. The fact that they may not express pain and suffering in ways that we can understand does not mean it does not occur. We do not have the knowledge to determine whether sea urchins suffer. If they exhibit adverse behavior to an invasive action I think it is a reasonable assumption that they can suffer.

We should be testing a broad biogenic net and exploring the sentience and cognitive ability of as many species as possible. We need to look into invertebrates, lower vertebrates. For instance, I have a lot of trouble with fishing, believing it to cause suffering. We need to be aware of individual differences among those of the same species. One gorilla does not equal another gorilla. I am not denying the existence of common species characteristics, but asserting that we need to look at both species and individual characteristics in order to understand what is going on with a particular animal. I realize there are times when we are forced to make a fast policy decision without a lot of information. We never really have enough information but we must do the best we can.

If we have question as to whether or not an animal is sentient we should go with the assumption that the animal is cognizant. If later determined otherwise we can change our policy, but we need to make that initial assumption of sentience in order to avoid suffering.

Cognitive behavioral studies, as Bekoff said, are best performed in natural or wild conditions, for in this way we can best understand how the animal operates in its own world. Such knowledge will help us replicate the animal's natural environment to the maximum extent possible while in captivity. I understand that the behavior of zoo animals gives us insight into their well-being, but the focus should be

on what studies show us about their behavior in the wild.

I myself have never believed that appeals to brutality of nature justify any of our actions towards animals, whether it is bringing them into captivity, displaying them for educational purposes, killing them for sport or for their fur. Such a defense does not work. Nature is not a moral agent. Humans are moral agents. When we impose our actions on animals it is our responsibility to act in as respectful and kind a manner as possible.

Although captivity may provide animals with respite from some types of problems it gives rise to other concerns, such as the loss of autonomy. The problems raised in captivity may cause an animal suffering that we cannot comprehend. This concept is the reason that most animal protection agencies feel there are very few justifications for keeping an animal in captivity. The two justifications I think most of us would accept are the breeding and preservation of endangered species and education of the public about animals. Personal experience and other modes of knowledge are important additions to scientific study but may lead to rampant anthropomorphism and total misunderstanding of animals. We also need to be aware of whose personal opinions we are using. For example, a lay person may think a monkey is suffering when in fact it is having a wonderful time.

Although I use them myself, euphemisms such as "euthanasia" and "harvest" obscure what we are actually doing with animals, and it would be much more honest if we used the word "kill."

Rowan: In terms of the sentience issue you raise; if one applies a heat stimulus to the feet of a human quadriplegic she will withdraw her foot, but feels nothing. There is no suffering or pain involved for the human in that situation. It is just a reflex. This is where the cognitive element, I think, demonstrates its importance.

?: How do you know they do not feel pain?

Rowan: They report that fact.

?: Exactly. The problem is that an animal is not able to express that to you.

Rowan: I agree that the situation is difficult. However the fact that a sea anemone withdraws from a physical prod does not necessarily mean that it is suffering. Suffering is a very curious issue, a word we throw out very widely and broadly as if we are all clear as to its meaning. I am not sure that we are.

?: I agree, and there is much that we do not know about that realm. However we certainly know that some creatures suffer. Some make the argument that we have no way to be sure, therefore the whole principle should be set aside. That is certainly not your argument. We know that cows and other animals feel pain, there can be no doubt. We should not let this contention swipe away the merits of the evidence.

McManamon: I have some of Terry Maple's comments regarding Bekoff's paper, and have interjected some of my own. There are many very thoughtful and important concepts in Bekoff's paper, and both Maple and I agree that animals have cognitive ability and should be studied as much as possible. The most common concerns today focus on the well-being of animals in zoo collections and the wild, and we support the use of several measures, specifically behavioral observation, to evaluate the success.

The ultimate goal of well-being is to save the lives of a population of animals. When you save a species you save a multitude of individuals. Zoo professionals must be concerned with individuals, but there are situations that require compromise or sacrifice of an element of an individual's well-being for the greater good of many, the population. Wherever possible we must strive to respect the rights of both individuals and species to achieve a win/win situation.

The fundamental challenge for zoo professionals is time. In Rwanda a slow but steady encroachment of humans into gorilla habitat has been execrated in just a few days. Thousands of people are fleeing for their lives from cities into the countryside. Many of our actions are occasioned by such emergencies or the rescue of individual animals. We often must act with incomplete information or inadequate time. We willingly debate the role of cognitive ecology in questions of well-being and conservation, but life and death goes on while we await data and conclusions. Maple was trained for a life of academia but became immersed in the zoo world and international cultural perceptions.

Faced with the choice of debating theoretical issues here at the conference or formulating actions for a chaotic and imperfect wildlife situation, he rushed to aid the gorillas in Rwanda. I am certain that anyone else in this room would do the same.

The well-being of wild gorillas depends on peace and goodwill among humans. By acting to protect their ecosystem we protect all creatures within it, including creatures with lesser powers of cognition. Maple and I recognize that cognitive animals are easier to protect. They are easier to discuss than to speculate about. So are the more beautiful and cuddly creatures. But we are equally concerned about those that are less gifted, reptiles being a case in point. We do not know the limits of their perceptions or intelligence but when faced with a rattlesnake roundup, a situation where the snakes are poisoned and the habitat is degraded for other species, the snake's cognitive abilities should be irrelevant as far as our willingness to defend the snake. By defending any class of wildlife we surely protect them all, even if only indirectly.

Criminologists have discovered that children with a history of cruelty to animals often grown up to be violent to other humans. Intervening on behalf of a reptile today may save the lives of other species tomorrow. In its educational mold a zoo teaches personal responsibility, empathy and love for animals. Hopefully this will inoculate the developing child against being neglectful or cruel later. The empathetic zoo teaches people to care about the well-being of wildlife. The sights, sounds and smells of an individual animal is a profoundly moving experience for a child.

Bekoff reminds us that it is possible for animals and people to learn to trust one another. But the well-being concept promoted daily in the zoo is often done under conditions of distrust. Many animals learn to fear the veterinary staff and the discomfort that the veterinarian may cause by handling or separating the individual animal from the group, yet the work of the veterinarian directly improves the animal's overall well-being. The removal of a tumor causes pain that is significant and may last for some time, even if it is followed by a longer period of improved well-being. The cause and effect are unlikely to be perceived by the animal. Animals may distrust us and we may have to deliberately double-cross them to issue a medication, but the eventual outcome is beneficial for the animal. Trust is a wonderful thing, but often we must act in the absence of trust. Such relationships are similar to a

parent/child interaction where the experienced parent must choose therapy even though it hurts.

The fascinating questions raised in philosophy and cognitive ethology are worthy of study. However, world events such as poaching, war and habitat destruction continue to decline populations. Extinction is a likely outcome for many charismatic creatures such as gorillas, rhinos, condors, tigers and pandas. Answers are needed to the questions of cognitive ethology. Such information may change the direction of our conservation mission. Action, even if incomplete or sometimes misguided, is a priority. Rather than succumb to learned helplessness we must act to save Jethro or the wolves. Either choice is acceptable, for inaction or refusing to make the choice will ensure that both are lost. Far better that we try to act to save both, but painful decisions will be inevitable.

Bekoff enlists the name of Schaller in his criticism of captive breeding programs. Bekoff should have mentioned that Schaller was not critical of captive breeding in general; Schaller criticized the management program for giant pandas in China, both captive and wild. It should be noted that there is currently no captive breeding program for pandas in North America, although we do aspire to create one.

Returning to the dilemma of Jethro dog and the last remaining wolf; Maple and I have debated issues of similar complexity having to do with orangutans. When Maple was chairman of the Orangutan Species Survival Plan it was decided to manage three populations of orangutans. There were two pure species, and these were permitted to breed. The hybrids were designated as a non-breeding population. To some degree this has resulted in a relatively neglected population since it is difficult to allocate identical resources and space to a population that will be essentially managed to extinction. The point here is that the committee had to act, even though we were uncomfortable with the arbitrariness of labeling or excluding hybrids from breeding situations. At the time we knew how to genetically differentiate individuals, though we did not know to what extent separation was present in the wild. We could either produce more hybrids or manage them separately. We chose to act, even though the biological meaning of the distinction was still being debated. In the end the decision was confirmed by the subsequent research and the limited space is not further reduced by the hybrid offspring that would have been produced in the

interim when we were delaying.

Finally, Maple and I have a question for Bekoff. Is a human being in captivity, or in circumstances that limit his or her autonomy, less of a human being? We must recognize the inherent wildness in our captive animals. We must seek ways to preserve and elicit their natural behavior patterns. This is the essential goal of all programs of enrichment and naturalistic architecture. In captivity a wolf might express only ninety percent of his identity, but it is still a wolf. If we handle the situation properly and constantly seek the truth, such an animal will not be mistaken for a dog.

Rowan: Bekoff, before I ask you to respond I would like you, if you would, to respond to the issue of euphemism. I too believed that "sacrifice" was an inappropriate term until I read a paper on sacrificial symbolism. I no longer believe that sacrifice in the animal research laboratory is the wrong word, I think it is actually a great term. It means, in anthropological terms, converting an object or being from one reality into another. Laboratory animals are converted from animals to data. The word "sacrifice" connotes not only harm or cost to the individual being sacrificed, but also harm or cost to the individual doing the sacrificing. To me the word, used in that deeper anthropological sense, is in fact a more accurate description than "killing," a word which lacks specificity. It is a much richer thing than just killing an animal. People are not doing it arbitrarily.

Hutchins: I am bothered by the fact that there are a lot of assumptions regarding how scientists feel about animals and how they relate to them. There is a myth that scientists are totally unbiased and look at animals as mere objects. I certainly did not do that when I was studying mountain goats in the wild. I recognized individuals, and subtleties in their behavior. I think that makes our decisions about animals and wildlife much more difficult. However, I would rather have someone like myself who cares about animals making those hard decisions than someone who does not care about them.

These are issues regarding our philosophical considerations of the liberty and autonomy of animals. I would argue that even humans do not have liberty and/or autonomy and that all social animals operate under considerable constraint. I am a strong believer in environmental enrichment. This gives captive animals more opportunities to make

decisions, under constraints; but, wild animals are under constraints as well. An animal cannot go into another animal's territory, is limited as to where it can move, and socially constrained in the way that one interacts with other individuals within a population. These are decisions that animals make, although we are not aware as to how much cognition is involved in each decision. Certainly there is some cognition in many of the decisions that mammals make. Wild animals are not free to do everything that they wish, but the potential for decision making even under constraints is something that we do need to consider. We need to offer opportunities for captive animals to make choices, knowing that those choices are always constrained by some external factor.

Bekoff: I suppose "sacrifice" is a richer term, more loaded than killing. I dropped out of a medical program because I was tired of being told that I was sacrificing cats. I was twenty-five years old, doing great research in neurobiology. I woke up one day and decided I did not want to do that anymore. I was killing cats. I can see that there are deep anthropomorphic meanings to the word sacrifice, but the fact of the matter is that I was walking into a lab and cutting the heads off cats and trying to localize a lesion that we had been producing in their brains. I wanted to be a neurosurgeon but I did not want any part of that. I agree there are terms that are more appropriate. Maybe "sacrifice" is acceptable, but for me it just does not cut it.

Interventions, the removal of a tumor for example, are necessary intrusions. This is not the same as the basic intrusion on an animal's life, keeping him or her in a cage. I feel they are very different issues. As for natural constraints, Joe Coyote not being able to move six feet because Harry Coyote has territory boundary is an incredibly different notion of constraint than if Mark Bekoff goes into the field and builds a fence so that Joe Coyote's movements are constricted. If you are a subordinate animal in a group you do not have what we view to be a "great life." There are studies that show that subordinate animals in groups are far better off than subordinate or even high-ranking animals that live alone, at least in terms of the protection incurred by being in a group.

Jamieson: Maple's comments included remarks on "the zoo." Just as we recognize variability among animals, not speaking of "the cheetah" or "the gorilla," we ought not talk about "the zoo." We all know that

in a great many zoos animal welfare is really deeply and seriously compromised. That is an issue that needs to be discussed.

In 1985 I wrote a paper stating that zoos did not do enough regarding education. People disagreed, asserting that the role of zoos is captive breeding and species survival. So when I then talked about species survival certain people said that zoos were educational. What do we want people to learn in zoos? What do we think they can learn in zoos? How effective are zoos at education? These are really open questions and we have a lot of rhetoric about what goes on. If we are serious about education we need to have some empirical data.

Hutchins: There are approximately nine million school children every year that go through a formal educational experience at AZA institutions, and there are a number of programs that are extremely effective in changing people's attitudes about animals. Some zoos ask people to take personal responsibility, to make one sacrifice for wildlife life such as recycling. Other programs are done jointly with similar organizations. One hundred and five million people go through our institutions every year. I agree that we need to get better at what we do, but zoos are the place where most urban dwellers, ninety percent of the populous, are going to come into contact with wildlife. The potential is tremendous, and I agree that we need to think hard about what our goals are and follow through on them.

Clutton-Brock: In response to a comment made earlier by Lewis, fishing is like hunting; conservation and therefore welfare of a species or animal ecosystem is often attained because fishermen are such a powerful lobby. They do manage to conserve rivers, particularly in Britain where waters are cleaner than they otherwise would be because people want to fish. This concept can be brought to a laboratory situation in which the animals are sacrificed. We do not know if the animals sacrifice themselves willingly. They may realize what is going on and agree to be killed for the sake of science. We have no idea what the laboratory animal is thinking.

Clifton: I think the following illustration can easily be clarified with a very simple diagram. Draw yourself a line with a "y" axis. Mark one quarter of the axis education, which I think all of us in the zoo business or animal protection business agree is one of our important functions. Another axis would be animal and species protection, conservation for

short. The third axis is one that many of us deny exists or intermingle with education; entertainment. This is where many of the conflicts of our respective occupations and organizations come in. Zoos have to bring people through the gates to generate some of the revenues that support our various programs. You have got to give people access to the charismatic species. Animals may prefer privacy so we have to find a way around that conflict. Those of us in the news business have to keep people reading. We cannot just focus on education. We have to have a certain amount of titillation, a certain amount of sex, scandal and horror because if people do not buy the paper they do not get the education and we do not stay in business. People in animal protection are in the situation where they have to bring in contributions to keep the non-profit organizations going. The range of things they are capable of is similar to what the news media can do, but animal protectionists are more restricted in their opportunities to use sex and humor. They have to do their shocking with the animal "horror story." That is essentially an entertainment function too, although I have never heard anyone in animal protection acknowledge it. You have got to have your horror show of the week in order to keep your organization running. This builds in an inherent conflict whenever an animal protest organization decides it wants to address an issue. In order to generate the issue it has to come up with a horror show. They cannot say "Here is a problem. Let's work together to find a solution." They have got to say "Here is a terrible situation and zoos are responsible." I would like to see this aspect of entertainment addressed.

Lukas: I would like to bring the discussion back to well-being. We have tied the animals to the ecosystems involved. The well-being of the individual is directly tied to the location and place where it lives. Another critical point; man has been on this continent for eleven thousand years and has been burning the woods in the south eastern United States for ten thousand years. Man is an integral part of these animals' lives. It is a continuum, but we cannot say that animals far removed from people are experiencing a state of well-being. There is a certain level where man has gone too far in being involved with the environment, but to say that man has no part in the well-being of animals is ridiculous. In a captive situation man is directly involved in the well-being of that animal. It is intent that must be considered. Sometimes being close to man is the best for the well-being of some species.

Weer: I am an educator, therefore I approach this discussion with the hope of expanding my ability to instruct. I had an interesting experience this summer when I took my daughters to the New Orleans zoo. They had a swamp exhibit that was really exceptional. In one corner of the zoo you could hear growls and snarls and noises coming from a plastic dinosaur. You had to pay an additional \$8.00 per person, after paying the zoo's \$15.00 entrance fee, to look at this exhibit of plastic dinosaurs. The entire crowd was lined up to see the dinosaurs rather than giving their attention to the wonderful Louisiana swamp exhibit. Is it true that we have to base education on live animals that one can smell and touch and see? Does this go back to the entertainment factor? What and how do we educate? Would we be better off with a plastic elephant? If we are going to justify our being here through education, maybe we need to look at how people learn, what they are learning, how they want to learn. The average person spends forty-four seconds in front of each exhibit. Ninety-seven percent of people go to zoos go with someone else. People that go to art galleries and museums traditionally go alone to really experience and learn.

Kaufmann: One thing I have seen in the educational departments of zoos I have been associated with is that we do a disservice to the public when we circumvent the role of animals in our lives. It is not just that we eat them, not just scientific or that historically they have associated with us; they are beautiful. We can enjoy them, we can love them. It encompasses the realm of art, the realm that is totally away from the logical, from the scientific, from the things that can be defined in words. There is a great fear of those realms in the educational departments of some zoos. They are desperately trying to contain the educational message in scientific, rational terms. There is very little room for things that are fuzzy. This fear is destructive because the general public, specifically children, need that to make that connection.

Serpell: I think we need to be cautious about assuming that the place where we find the wild animal is necessarily the habitat to which it is ancestrally adapted. Animals have been moved into marginal habitats as a result of human activity. We also have to take on board the developmental history of that individual animal. An animal that is born and raised in captivity will have very different habitat preferences from its kinsman who have been raised in the wild. It might be quite wrong to stick it in captivity if there is only one left or if it is not familiar habitat. You might actually be harming its welfare.

I also wanted to address the question of educational roles of zoos. It is not enough to say that millions of children visit zoos, for we do not know that the experience of simply observing animals in zoos is educational. It might have a very serious negative effect in some cases. I used to spend my lunch hours standing in front of the cages and listening to what was being said about the activity going on inside. Very often I went away extremely depressed, for an image of the animal was being concocted that was extremely denigrating to that creature, particularly with primates. There is an urgent priority for zoos and similar organizations to organize their strategy regarding education as well as differentiate education from recreation.

I also wish people would stop misquoting the studies dealing with psychopaths having been cruel to animals as children. People constantly quote this as if it demonstrates a cause and effect relationship, that because those people were cruel to animals they therefore became psychopaths. There is no evidence for that conclusion and the issue really needs much more study before we can make such statements.

Bekoff: Of the five major factors they have found that produce psychopaths, none had to do with interaction with animals. The types of interaction serial killers had with animals stem from lack of socialization with other human beings.

Robinson: One of the problems we have as a group is the inability to focus on something on which we can disagree. I, like Bekoff, am a behaviorist and am interested in cognitive ethnology. I can read his paper and agree with what he has to say. When it comes down to the fundamental points which were discussed I do not think there is really any fundamental disagreement. None among this group disagrees that animals possess cognitive ability, there is no fundamental disagreement that animals suffer, that human interest should not be the focus of concern or that animals should be able to live their lives in nature. So why are we having this particular discussion? All of this comes down to one issue; when is intervention really necessary? How do you justify captivity?

Rowan: I came in to the discussion thinking that one of the fundamental issues was species population versus individuals. I now feel that the fundamental question has to do with human intervention. Is human intervention desirable? When is human intervention desirable?

What type is desirable?

Grandy: Bekoff began this morning by talking about sentience in animals. I was pleased that he included all species rather than restrict his comments to major species. Later he talked about having a few programs which were exemplary rather than a number of programs which were merely average or worse. The comments following Bekoff's presentation were extremely good, and I was particularly taken by those statements having to do with the type of debates Robinson just mentioned. We have found ourselves in discussions that go on and on about ethnology, cognition, wildness and liberty. These are interesting and important things. Then we went on to discuss children and education in zoos. I find myself beginning to like what I am hearing, for we are drawing a lot of things together and getting to the real issues.

This group needs to talk about and come to grips with the conditions that are in zoos. It is really tempting for all of us, particularly here at White Oak where we see the best that can be dreamed of, to concentrate on the best. Although there are zoos in the United States that meet our standards, the animals in the majority of zoos are suffering. People who see squalid conditions in zoos time after time will come to think that is the norm and is acceptable.

Hutchins: I agree. Roadside menageries are an abomination and should be closed. AZA has been critical of the United States Fish and Wildlife Service for its policy of granting permits to organizations that are not involved in cooperative scientifically-managed breeding programs and do not have educational programs. I think we can find a consensus that such a situation should not occur. Such facilities are not AZA members and therefore we have no way to influence the situation, other than trying to educate people about what good zoos are and getting people politically active in changing some of the policies.

We have spoken of individual variation extensively. Variability results in flexibility, and in good captive conditions animals are flexible enough to adapt to those kinds of conditions, perhaps not suffering as much as we assume. I am not discounting the issue of well-being, but environments vary and animals adapt to them.

I believe that conservationists operate under certain assumptions,

assumptions that are well thought out and thought to be justified. One of these assumptions is that biodiversity is good. But it is naturally occurring biodiversity that is good. We could artificially create varieties of different animals and release them in the wild, but this is not the type of diversity we are striving for. I am not apologetic for the values held by conservationists for I believe they are good for a variety of reasons, reasons running from the aesthetic to the practical. I do not think intervention is always a great thing. It causes problems and mistakes are inevitable.

Lindburg: Jamieson asked about data on the types of educational programs at institutions. A multi-million dollar exhibit was built in San Diego with beautiful grounds. We put a person there with a stop watch, the objective being to see how many people who stopped took at least ten seconds looking at the plaque, which took a minimum of three or four minutes to read. The results were less than 2 percent. We did not know whether to conclude that it was a bad plaque or the results had a deeper message, namely that most people do not come to zoos to be educated. We have to recognize that the public perceives a zoo to be a place to go to be entertained. The last thing that the majority of people have on their minds is conservation or education, therefore the objective for educators is to "trick" the public, get a learning experience into that visit motivated by other reasons.

Natural behavior is inherently interesting, no plastic elephant can have the same effects as a real one. There is presently a great deal of concern for creating circumstances where natural behavior will be observed. I found it a breath of fresh air that Bekoff did not allude in his paper to an act of Congress mandating that we be concerned about the psychological well-being of animals in captivity. (see ANR's notes). It is encouraging to know that in the last decade zoological institutions have made tremendous strides in focusing on so many of the concerns we are discussing here today.

ANIMAL WELL-BEING IN THE WILD AND IN CAPTIVITY

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INTRODUCTION

Some, like a character in Galsworthy's *The Forsyte Saga* (1922, 189-191), would consider there was nothing to discuss about the rival merits of wild and captivity. "To shut up a lion or tiger," thought Young Jolyon at London Zoo, "was surely a horrible barbarity." Here is contemporary comic writer Stephen Fry in serious mood: "Is it possible, [our grandchildren] will ask, that we actually stole polar bears away from the Arctic and set them in concrete-floored cages in southern climes to be gawped at?" (Fry 1993, 275). In fact, similar sentiments were expressed 600 years ago by Chaucer (1960, 524), who noted how a captive bird's wild habitat ('a forest, that is rude and cold') seems unattractive to us (as compared with the fine conditions we think we are providing), but there's no doubt which the bird would prefer: "For ever this brid wol doon his bisnesse; To escape out of his cage, if he may; His libertee this brid desireth ay."

Some recent philosophical writers, who seem to be fighting a sort of rearguard action on behalf of behaviorism - the refusal to take seriously the reality and importance of the animal's own conscious experience - which has been scientific orthodoxy through much of this century, would probably suggest we were being anthropomorphic in worrying about the animal's own feelings. Michael Leahy (1991, 92) maintains that the captive animal's necessary non-realization of its situation, its inability to conceptualize its state, means that these must be quite different from, and nothing like so serious a matter as, human captivity. Another philosopher who thinks our concern for animals misplaced is Peter Carruthers (1992, 196). Peter Harrison (1991) thinks animals no more able to suffer than plants, because of their lack of an inner life. I don't agree, not least because thinking this way seems so out of line with our recognition - on straightforward scientific grounds, 135 years after *The Origin of Species* - that we humans are ourselves

mammals, primates, indeed probably on genetic grounds strictly apes (Dawkins 1993, 82).

I believe we can sensibly speak of an animal's well-being, and not just in the sense we might possibly speak of a plant's well-being. An animal in a state of well-being presumably feels better, perhaps enjoys itself more, at least suffers less than if it were in a poorer state.

Let's come back to the dreadful contrast of wild and captivity, as portrayed or suggested by Chaucer, Galsworthy and Fry. It seems to me that there were several other, and more acceptable, ways of keeping animals even long ago than the bare cages we should all abhor - deer parks, for example (Bostock 1993, 18-20). Francis Bacon wrote 400 years ago about how he didn't like aviaries, except they "be of that largeness as they may be turfed, and have living plants and bushes set in them; that the birds may have more scope and natural nestling ...". Wouldn't a bird, kept in an aviary like this, probably not choose to escape, even if it could, and wouldn't that be a pretty good indication of good conditions? I will come back to the range of ways of keeping animals in my last section, to try to show there are acceptable approaches to keeping animals; some kinds of "captivity" contrast pretty favorably with the wild, though we need, ideally, as much knowledge as possible of the animal's natural habitat and way of life there, to make our captive conditions acceptable.,

But first, I want to compare wild and captivity. This isn't a straight comparison of good with bad. Animals do suffer in the wild, and they are protected in good captivity. I will fill out the details of this in the following sections, before discussing how captivity can be more benign, whether or not it can ever strictly be regarded as better than life in the wild.

LENGTH OF LIFE AND VIOLENT DEATH

It was all very well for Blake to write that: A robin redbreast in a cage Puts all Heaven in a Rage but he couldn't know that robins normally live in the wild a mere tenth of their potential life span and have, any year, only a 50% chance of surviving to the next (Lack 1970, 88-106). So captive animals often do live longer than wild ones; for many animals it must be true that only with human protection have they any chance

of dying of (as we say) old age. A robin in a roomy, comfortable aviary like Bacon's might have a rather good bargain in terms of total pleasure or satisfaction from living. The risks in adult life for large mammals like lions or chimpanzees are probably much less than for small birds or small mammals such as rodents, but there will still be for lions and chimpanzees a high death rate in early years (as there was with humans until the protection offered by modern medicine). Bertram recorded that about 20% of lion cubs survive in the wild to maturity, most cubs dying of starvation.

Not, of course, that the animals know they face short lives, so it doesn't make their lives miserable, as the theologian B. H. Streeter (1935, 156-7) notes, in the course of considering the degree of suffering in nature. However, so far as zoos are concerned, it is surely true that many of their animals would, if they had lived in the wild instead, have died young. If we assume that in some cases at least life in a zoo is satisfactory for the animal concerned, and where an animal would have been living no life at all were it not in a zoo, in such cases the comment on their captivity "It seems sad" is inappropriate (Rachels 1976, 213).

Not that all animals in zoos live to old age or, sadly, can all be allowed to. As the breeding of captive animals improves and approaches the rate of increase in the wild, either birth control or the killing of surplus animals is likely to be necessary (Cherfas 1984, 119, 122). But at least if any animal has to be killed in a zoo it will be a humane death. Death in the wild can be violent, or slow, as from injury or disease.

A mouse caught and played with by a cat is not a pleasant sight; a wild cheetah will provide her cubs with a living, injured young gazelle to practice hunting on (Ammann 1984, 111). Personally, I find disturbing even the sight of a hen carrying a struggling frog. Still, these may be isolated incidents. Obviously, they will only happen once in a victim's life, and may in any case be alleviated by the action of endorphins or some similar mechanism, just as severely injured humans (in sport or battle) often feel no pain till later. Still, I would dispute the confidence of Streeter (1935, 156-7) that life and death struggles between animals involve little suffering because non-humans probably hardly feel pain. On biological grounds this seems unlikely, as recognized in an interesting discussion by the contemporary theologian John Hick (1968, 356 ff.).

So the fact an animal in a zoo is protected from the violence and other dangers of natural life is not an aspect of captivity to be scorned (Jones 1987). We are in some degree conferring on our captive animals a protection which civilization has (to some extent) conferred on ourselves.

ARE ZOO ANIMALS HEALTHIER THAN WILD ANIMALS?

Take health first in the straightforward sense of freedom from infection or injury. Wild animals are anything but free from such problems. A single individual can be astonishingly heavily parasitized (Rothschild and Clay 1961, 17). Wild animals can be very much worse for wear compared to their protected, medically attended cousins in captivity; for example a wild lion compared to a zoo or safari park lion (Smith 1979, xv).

Many wild animals must be able to cope with their infections, but those who cannot die. If serious ill-health isn't obvious among wild animals, that is because a seriously unhealthy wild animal is soon a dead one. The middle course open to humans and well-cared-for captive animals is not an option.

Still, mild states of ill-health can cause discomfort without causing death. A successful parasite (biologically) does not kill its host, but may cause discomfort or worse. Here the captive animal is better off in that treatment easing minor suffering should be available.

But zoo animals can have their own particular health problems. The stress of being captured and transported can make an animal more liable to serious parasitic infection. Conditions in zoos can aid the spread of parasites, or else necessitate the provision of a dull, sterile environment in order to restrict their spread. Ungulates kept in small paddocks are prone to parasitic infection; cats can be, when kept in other than very large enclosures. Until recently, they were thought to require concrete or tiles, easily washed and sterilized - and thus robbed of familiar and carefully deposited smells. It has now been found that deep woodchip litter, in addition to other advantages, prevents parasites' eggs surviving. The new findings have greatly improved the situation for zoo primates too (Chamove et al 1982). An animal can be exposed in a zoo to infections that it wouldn't face in the wild (Dunn

sense of purposefulness.

Our feeling of frustration in failing to complete some task is (like pain, pleasure and boredom) no doubt biologically useful. So it is likely that animals can feel similar frustration to ours - say if a lion has a meal to eat, but keeps being disturbed by hyenas.

Probably very important also are a sense of security and a sense of belonging. The Harlows' (very inhumane) experiments showed how infant monkeys need a source of security, a source of confidence (Rowell 1972, 135 ff). Dogs can show their general sense of unease by failing to groom themselves. Of course an animal should be able to enjoy this sense of security, and indeed many other pleasures, in good zoo conditions.

Obviously in the wild there are all sorts of discomforts, problems and very real dangers: parasites, insect bites, problems of finding food - the unpleasantness of sometimes going without or actually starving - and so on. But we have our problems too, and for most of us, most of the time, they are not overwhelming. What often prevents nervous breakdown is a sense of purpose and a sense of security. Although war is a cause of appalling suffering, the suicide rate tends to go down in wartime, presumably because people have more sense of purpose, and of comradeship and belonging, and these more than compensate for the presence of extra hardships in preventing extreme depression. A state of non-depression, a state far from that extreme depression which could lead to suicide is likely to accompany the state of being very busy; having things to get on with.

It is probably important to many animals, too, to have plenty to get on with, which wild animals normally obviously do, as well as having a sense of security and, where appropriate, companionship, a home base and proper relations with one's companions in the case of a social animal. Marian Dawkins mentions experimental findings that sheep are stressed by situations such as being put in a truck or chased by a dog but nothing like as much as they are stressed by simply being separated from the rest of the flock (Dawkins 1980, 59), which bears out what I am suggesting.

And life in the wild is often not all "business," essential activities for survival, compensated for only by a sense of purpose such as I have

been proposing. There are also plenty of reports of animals enjoying themselves in a direct way - otters sliding down banks, badgers playing leapfrog, and so on.

So in brief, to give the provision of regular food and safety from predators and other dangers, not to mention discomforts, as pure and simple advantages, of captivity over against life in the wild is to leave out certain related disadvantages which go hand in hand with such advantages: the loss, in particular, of purposeful living. However, in many cases it is possible to provide conditions of captivity which do a lot to compensate for the loss of the positive side of wild existence. But we need to recognize that positive side to realize our responsibility to provide suitably enriched captive conditions.

EVOLUTION AND ADAPTATION

All animals, obviously, are adapted to life in their natural habitats (the "wild"). I think it follows from this that they are in a state of well-being there, but only to some extent. It follows also that they are not very likely to be in a state of well-being in captivity, but not that they can't be in a state of well-being there - certainly if we take trouble to provide what they need.

One argument for animals' positive well-being in the wild is that as animals presumably cannot live efficiently, and cannot reproduce efficiently if they find life too difficult - if they get too disturbed, or too miserable, or are hurt too much - there will be selection of characteristics producing some degree of well-being, perhaps some degree of happiness (Darwin 1929, 146).

Whether this is an additional adaptation, or an additional feature of adaptations in general - i.e., perhaps adaptation in some respect to a particular aspect of one's environment involves being in a state of well-being in regard to it - my next point is that adaptation is not perfect or complete. Here are several reasons for this (perhaps worth noting not least because passionate people like the novelist Richard Adams who oppose zoos are inclined to talk as if animals are perfectly adapted to their natural environments - and therefore inevitably in a state of ill-being anywhere else).

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1. Animals are, so to speak, never designed from first principles, but rather themselves “adaptations”, in the sense of “adaptive alterations,” of what went before. One human example of imperfect adaptation is the tendency to suffer arthritis around the area of the hip bones, probably partly as a result of our being a two-legged “vertical” animal converted from a four-legged “horizontal” one.
 2. If animals were perfectly adapted, evolution, which is essentially the improvement of adaptations, could not occur (de Beer 1972, 10).
 3. All individuals of any particular species differ slightly, having slightly different sets of genes, so that they are not equally adapted, even though to a great extent they are all inheritors of millions of years of natural selection. Even if one could identify a pair of animals almost perfectly adapted to their environment, their young would not be to the same extent, or to the same extent as each other, for all get dealt a slightly different genetic “hand.”
 4. As evolution is a matter of the differential passing on of genes, so that different genes gradually become more widespread through the gene pool of any particular species, as a result of the individuals carrying them being slightly more successful in reproducing, the welfare of individual animals is hardly going to be benefited by evolution except in as much as genes aiding welfare also enable the animals carrying them to reproduce successfully, which also includes surviving long enough to reproduce. There seems no way in which the welfare of animals past breeding age can be selected for, except where their welfare assists younger relative of theirs to reproduce.
 5. There must be some “survival of the fittest.” Although even a small reproductive advantage conferred by a gene is enough to ensure its selection - i.e., its gradual spread through the gene pool - it seems likely that many individuals of any species die young, in some cases this being part of natural selection (i.e., where the death is due to some genetically inherited disadvantageous feature in an animal compared to its conspecifics). So while the so-called struggle for survival is in many ways a

peaceful struggle, hardly suggesting nature red in tooth and claw, it still does involve a great many animals dying long before their potential life span, and by no means entirely without suffering (as we saw above).

6. In some cases certain species, as a result of environmental changes they fail to adjust to, are in varying degrees ill-adapted (de Beer 1972, 10-13). Animals (perhaps certain more adventurous or exploratory individuals of a species) will sometimes move into new habitats, or may adopt some new behavior. This may be a substantial factor in evolution (Hardy 1975: 37-45; Ewer 1953: 117-119). In the new habitat or the new niche, selection will operate to improve adaptation to it, but this will be a slow process, and the development will be occurring in a population, not in any single individuals. Some or all individuals may well be rather ill-adapted in the early stages of moving into a new habitat or a new niche, as in the situation of an environmental change which forces upon a population a need to adapt, if it has enough genetic adaptability; failure to adapt in such circumstances is likely of course to result in extinction (de Beer 1972, 5-6; 10-13). Tigers may have moved fairly recently into tropical regions, and be as yet inadequately enough adapted to them to suffer discomfort from the heat.

So here are several reasons why adaptation cannot be perfect, and I think they are reasons similarly why animals are not going to be in a state of complete well-being in the wild. They aren't necessarily reasons why animals are likely instead to be in a state of well-being in captivity, not least because we, in our varying degrees of ignorance about animals' environmental adaptations, must often force upon them captive conditions to which they are not at all adapted. However, it's still quite possible that captive conditions may be comfortable in ways in which wild conditions are not. Natural selection isn't operating, or not in the same way, in captivity, so animals are here free of the factors which are likely to produce some degree of discomfort in the wild.

Another point about different animals' possible "suitability" for captivity is that animals are adaptable as individuals: they have varying degrees of cultural or behavioral (or physiological) adaptability. Some move readily into new environments created by man (like cities); others cannot adapt so easily. Some become tame easily, some can be

trained easily, others not. Some can change their habits easily, e.g., switch to different kinds of food (of course, within limits); some (like koalas) cannot. This is a theoretical reason why it's not out of the question that we can keep some animals in a state of well-being. Of course we should go a long way, in fact as far as possible, towards providing the conditions they need. But the fact we can never do this perfectly - we can't reproduce the wild - doesn't mean that we can never keep animals properly. With our providing, as far as we can, the right conditions, and their ability to adapt (in varying degrees), it may well be the case that some of them can be in a state of well-being in captivity.

KEEPING ANIMALS

We began with comments on lions, polar bears and birds in cages. But keeping animals doesn't have to be like this. Sometimes, indeed, we can create an artificial habitat so attractive that animals just drop in: ponds for wildfowl, or for freshwater invertebrates, for example. Agreed, this is exceptional. In some ways the deer in a large park may be living almost naturally. The Duke of Bedford, who saved the Pere David's deer from extinction in the early years of this century, kept them at Woburn in a very large area with lakes and marshes, where they bred well, but also faced such natural hazards as a high loss of young born in particularly bad weather.

The more normal, basic way of keeping animals is in what I would (perhaps over-optimistically) call a semi-naturalistic enclosure - one which hopefully suggests the wild habitat to some degree, if not very closely. But the really important thing is that it should produce whatever features the animals need to allow and stimulate a large portion of their natural behavior, certainly including whatever means of locomotion - climbing, burrowing, swimming, and so on - they would normally use in the wild. For many animals such as various ungulates, and wallabies, their needs may be met by little more than a field suitably enclosed (Duncan and Poole 1990, 220). Rodents such as prairie dogs or porcupines may need only an enclosure of reasonable size allowing burrowing: they will create for themselves what else they need, and will be fully occupied by excavations and their social relations.

Even with animals quite easily catered for, there is always room for improvement, especially in the light of their wild behavior, guided by careful monitoring of the animals' behavior in the enclosure (ibid.: 222-3), but such improvement, or enrichment, becomes much more urgent with the more "difficult" animals: the highly intelligent, exploratory, opportunist and sometimes also (to make it worse) physically powerful animals such as bears, dogs, primates (especially apes), and perhaps pigs.

Needed here is ingenuity in doing all possible to make the animals' lives more interesting, in particular whatever can be done to elicit their natural behavior (Shepherdson 1988). The obvious deprivation of zoo animals is the occupation of food seeking which in many cases would occupy them for long periods in the wild. The remedy is to hide food so that it has to be searched for, or provide it so that it has to be worked for in some way. As before, it is usually a matter of providing a more or less natural-looking area. But where an area something like the natural habitat will probably be enough for wallabies, this may be far from enough, even with a tree or two or a climbing frame or two, for chimpanzees. A wooded enclosure the size of the chimpanzee island at Arnhem (de Wall 1982) is a different matter. Where an area like this is not available, it is still desirable for the enclosure to be as natural as possible or at least have natural elements such as a grassy area and plants, but it is still more important to provide what will stimulate the animals, which may be, for example, an artificial termite mound into which they can stick straws to extract not termites but honey. The significant thing about this example is that it is provided in the light of knowledge of what chimpanzees do in the wild.

Knowledge of the animal's wild habitat and behavior is the best source of ideas for what can be provided to enrich its captive environment, and naturalistic enrichment - features identical to those in the natural habitat which would stimulate the animals' natural, or simulation of wild features - is probably the best approach. Examples of such enrichment at Glasgow Zoo for black bears, polar bears and cats are described by Colin Tudge (1991, 223-8).

Markowitz has pioneered several elaborate devices to elicit their natural behavior from animals, such as flying meatballs for servals to leap to grab, or arrangements by which polar bears or primates can perform some task and thus produce food (Markowitz 1982, 46-55; 175-9). He

has found that many animals will voluntarily work for their food in preference to merely being given it, which is eloquent evidence of the need of some animals for occupation and even creative activity. Some of Markowitz's work has been criticized (e.g., for conditioning animals to respond to artificial stimuli) (Cherfas 1984, 128 ff; Campbell 1979, 213), but there is clearly great room for, on the one hand, learning from study of the animals' wild behavior, and, on the other, exercising ingenuity in how to simulate or substitute for features of their wild environment in the captive one.

Sometime animals may be kept in an enclosure which is frankly non-naturalistic but which is highly suitable for them even so because it succeeds in supplying what they need. A paradigm example of an enclosure of this sort, though not in a zoo, is the "enriched pig pen" developed at the Edinburgh School of Agriculture. Domestic pigs were studied in semi-wild conditions for many months and (very significantly) much natural behavior was observed. A pen was then designed so as to include the right features to elicit most of the behavior which had been observed in the larger area - nestmaking, rooting, and so on. This approach worked: most of the pigs' wild behavior still occurred in the "enriched pig pen" (Woodgush 1983, 196-8; Huntingford 1984; Duncan and Poole 1990, 209-213). Zoos will normally have much more space available than the area of the "pig pen", but the wild study leading to the identification of the essential stimuli for eliciting different parts of the animals' behavioral repertoire, and then the careful providing either of those stimuli or of substitutes for them is a fine demonstration of how an enclosure can be improved - or designed from scratch - in the light of study of the wild behavior of the species concerned.

Howletts' gorilla enclosure (near Canterbury in England) is a good example of a non-naturalistic enclosure which yet meets the animals' requirements admirably, as is borne out by their breeding success. The enclosure looks more like a sort of gymnasium than a bit of rain-forest - a sort of health club for gorillas, indeed, or a holiday camp.

Enclosures can be much more realistic - if money and imagination are available - as in some very elaborate displays described by David Hancocks (1989, 264), though some naturalistic displays (not Hancocks') are more for the public benefit than the animals'. Animal occupants of beautiful exhibits sometimes have far less space than

appears and can't reach the plants. And short term changes in enclosures - recommended for example by Hancocks - are unlikely to be feasible in vastly expensive displays with fiber-glass trees and the like.

A very different approach to keeping animals is training them to perform various tasks and generally treating them as domesticated animals, which camels and llamas are, and perhaps elephants too, though only partially. To have llamas pulling carts, and camels giving rides, where possible, seems, in view of their being domesticated animals, unobjectionable and likely to be good for their mental as well as their physical health (Kiley-Worthington 1990; Hediger 1968, 133-9).

So in the end contrasting the wild and captivity is not really the point, for it makes all the difference what sort of captivity we are thinking of. Really good captivity probably compares quite favorably with the wild, on which, in some respects, it should have been modeled. It also makes a great difference what animal we are thinking of. Our criteria for judging animal well-being - natural behavior especially, but also health, breeding, the occurrence of abnormal behavior and so on - should also guide us as to whether some animals should not be kept at all. Whether enrichment for (for example) polar bears (providing stimulating items to investigate and so on) is in the end more than alleviation of their captive state remains a matter of dispute. I wonder myself just how far we can compensate in a zoo for the range of experiences, the range of smells and sights and sounds, the meeting with members of its own or other species, of an animal's natural life. Much remains to be investigated.

Of course other matters come into the question of whether a certain species should be kept, such as the need or otherwise for conservation captive breeding. But our judgment of the animal's well-being must clearly be a major factor as a guide to action, only to be overruled to a very limited degree by other considerations.

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BOSTOCK DISCUSSION

Pokras: I love the fact that Bostock's paper came after Bekoff's presentation. This is a nice transition and melding of ideas. One of the issues I see Bostock questioning are the goals of keeping animals. We have educational goals, long-term conservation captive breeding goals, even research goals. Those goals are in some sense very separate. It may be that individual institutions cannot or should not be doing all those things, that perhaps specialization could be important.

Again, one of the important factors is timescale. If we are talking about a very short timescale, such as an emergency or a highly endangered species, perhaps it would be more appropriate to do a higher degree of intervention. But if our goal is long-term conservation of a population, one thousand years for example, then we cannot exclude evolution. If I want to keep a population for one thousand years I have got a very difficult issue, for I have a population that is going to be subject to a lot of evolutionary pressures in that one thousand years. That is going to be difficult to accomplish, for I cannot keep them by themselves. They are what they are because they have had the predator/prey interaction.

We veterinarians go in and inoculate short-term captive animals with a vaccine to prevent parasites. We should not do that with a long-term population. Parasites and hosts evolve together, they are a part of biodiversity. Elimination of the parasites is not in the best interest of the animal if they are to be held in long-term captivity. In the short-term we can enhance the animal's well-being, but if we are talking about evolutionary time our goals are very different.

Part of well-being is the issue of variety. Things change drastically over time, the time scale depending on that particular animal's biological clock. A very small animal with a high heart rate and a very short life span is running on faster time. Its life happens more quickly than that of a whale. Whales and reptiles do things very slowly. To appreciate and understand what is going on we need time-lapse photography or a different set of skills, understanding and sensitivity.

I do not know what animal's cognitive lives are like, but there is huge individual variation. Again, what that means for long-term captive management I am not quite sure, but think people have begun to take

that into account. Choice is a very important factor for animals in captivity. The word "choice" may have a connotation of consciousness that I do not mean to imply. I am speaking of the ability to make maximum number of choices on their own such as food selection. Perhaps this is bringing me back to the need for specialization, need for wider cooperation. There are probably a number of facilities that should not be trying to captive-breed anything, but do a wonderful job with environmental education.

Robinson: I will begin by addressing the paper on its own terms, and then look at certain fundamental assumptions that might underlie it and some of the disagreements that may generate. Without being pejorative, I read Bekoff's paper as a wonderful apology for captivity. I think the argument is made very strongly that life for creatures in captivity can frequently be favorably compared to life in the wild. The assumption is that it is better to live long, live healthy and be better fed. Certainly looking at our own species we recognize that that is not always the case. Literature is full of examples demonstrating that we do not particularly like pleasant, well-fed circumstances or the bourgeois life. The existence of hang-gliding and fast cars suggest that we do not like that lowest common denominator of good health. There is also the self-destructive urge, such as alcohol and tobacco, and anyone who looks at animals recognizes that animals go through the same thing. They frequently search out stressful circumstances.

Another thing that was alluded to in Bostock's paper is the idea of freedom of choice, the idea of mental health. How does one get at this notion? How important is freedom to us as human beings? To animals? Do we become accustomed to a lack of freedom? Is it relative? Is it purely an anglo-saxon preoccupation?

Looking at some of the deeper assumptions underlying the paper, there is an conjecture that the well-being of animals provides a criterion on which to evaluate captivity. I make the argument that once an animal is in captivity its well-being is of greatest importance. But the well-being of an individual animal is not the paramount criterion on which a decision is made about bringing that animal into captivity. This leads into another issue; how do you balance the well-being of individuals and species? Captivity can be justified on the basis of the well-being of the aggregate of all individuals in the species, rather than the well-being of the well-being of those individual animals in captiv-

ity. I think this assumption underlies many of the justifications that the captive breeding zoo community has used about bringing animals into captivity.

Why bother to conserve species? Is this an important moral argument? The answer to that question can justify the preceding one, which is whether animals should be brought into captivity. I would argue yes. I think we have a moral responsibility to care for our fellow human beings, domestic animals and wild animals. Because of our resource consumption and desire to populate the world with our own progeny we directly affect other people and animals. Because we do interfere in the lives of others, especially wild species, we do have the responsibility to conserve their populations, and to do so in as humane a way as possible.

Bostock: Rolston has very strong comments about how we cannot conserve animals in zoos because it is not done within the evolutionary process. It is outside natural selection.

Jamieson: Back to education; virtually all campaigns providing people solely with environmental information fail. In cases where information does work, people approach the data with conceptual models, belief systems. In many cases we simply do not bother to find out how people represent the issues, what their beliefs are. These models can be incredibly conceptually conservative. People assimilate new information in a way consistent with what they already believe. You can take two people, show them the same thing and they will each view that as reinforcing their private set of beliefs.

How information is presented is extremely important. Generally impersonal abstract information does not engage people. People are engaged by anecdotes as well as personalized and vivid information. The source of information is also of importance. Data that comes from institutions is much less effective than information that comes from individuals. Studies back up this notion of distrust of anonymous or institutional information.

My second point concerns suffering and nature. There is a lot of structuring and interpretation about what goes on in nature. We need to be cautious about the extent to which we incorporate stereotypes and social constructions when we discuss this issue.

There are two serious differences among the people at this table. First is the question of how we are going to handle the surplus of animals that results from captive breeding programs. Secondly there are issues of individual versus species. In some sense we all agree that nature is in the equivalent of an intensive care unit, and some believe in heroic medical intervention to save nature. Others are more skeptical, questioning if it tortures the "patient" more than helps him.

Lewis: It might be fruitful for the AZA and the animal protection community to sit down and have an honest discussion about whether something can be done together. I think that discussion would have to be undertaken with the understanding that no conclusion or common action might be reached, but the discussion may be positive nonetheless.

Lacy: Virtually every zoo, even the good zoos, has bad exhibits. It is worth discussing whether there is a way to close down those exhibits. There are animals in facilities that we know are not capable of providing a natural habitat. For example, any zoo that cannot handle polar bears should not have them. There are some very good zoos with polar bears in bad exhibits.

Farinato: Sixteen-hundred zoos are licensed and registered by the USDA. Of that figure, ten percent are accredited with the AZA. Ninety percent are not ascribing to anything we are talking about here. The few that teach empathy, personal responsibility, love and respect for wildlife are not the problem. The problem is caused by the others. What messages are being given to people visiting the ninety percent?

Hutchins: Zoos are being blamed for a lot of weaknesses in our society. People are getting inadequate scientific knowledge and coming to the zoo with those preconceived notions.

Regarding the issue of education and entertainment, we have a very puritanical view of education. Education and entertainment are not antithetical. It is possible to have both. However, if you go too far you wind up with exploitation rather than entertainment.

Bekoff: Bostock's paper is an apology. He unnecessarily makes an excuse for zoos, such as his appeal to death in nature as more humane than death in captivity. Is having a relatively good state of well-being

good enough? Bostock and I definitely disagree on what it means to have a humane death.

Lindburg: Feeding is one part of their keeping that is radically altered from the natural environment. Most zoos stop with nutrition and forget about the process; the searching, collecting, preparation and act of assimilation itself, such as parceling off thirty pounds of animal carcass with your teeth. Zoos take an anthropomorphic approach to provisioning. All have very expensive facilities for food preparation but the food comes out pulverized as though the jaws, teeth and hands of these animals were ill-equipped to handle the food.

Clutton-Brock: In response to Hutchins' question about what it is we are conserving I would like to remind everyone of Przewalski's horse, a flagship species in the world of conservation. It is really a non-species or a new species which came out of Mongolia in the last century. These animals are very inbred and have become domesticated. We really do not know what we are conserving here; is it a domestic or wild animal?

Lukas: In Florida all roadside zoos are state regulated. The federal government cannot do anything except through USDA inspections and enforcing minimum animal care. They have formed a committee with the state and are rewriting the laws together. Florida and California are the only states with such state associations, and as a result roadside zoos will eventually be illegal in Florida.

As for long-term conservation programs, there is presently an attempt to develop a model in Zaire where the priorities are to set up conservation programs and see to captive situations. Genetic material will be recycled from the wild into the captivity program and then back out to the wild. This allows the evolutionary forces to still maintain an effect on the gene we get from the wild population, as well as driving habitat protection. The key is a strong linkage between habitat protection and captive breeding programs.

PRESERVING INDIVIDUALS VERSUS CONSERVING POPULATIONS: IS THERE A CONFLICT?

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INTRODUCTION

It is relatively easy to achieve agreement that conserving biodiversity is a worthy sentiment, but vast differences in priorities emerge when there are competing interests and values.

Summarized briefly, animal liberation/animal rights' valuation of the individual above its zoological taxon or associates in a community is an extension of ethical theory to animals, using the criterion of sentience rather than rationality for ascribing to the individual the right to an existence free of human-imposed pain and suffering. Humans are not entitled to inflict pain for any purpose, according to this view, including the utilization of animals for food or clothing, for scientific and medical experimentation, for recreation, or even for the animals' own survival as a zoological entity. Insofar as they have written on the subject, the major articulators of animal rights philosophy have espoused essentially a hands-off policy with regard to preservation of animal life in the wild state. Singer (1975), for example, sees most human attempts at manipulating ecosystems as causing more harm than good (i.e., an increase in suffering), and advocates that we refrain from further meddling in their lives. Regan (1983), in an oft quoted statement, holds that "the rights view does not recognize the moral rights of species to anything, including survival" (p. 359), and recommends that with regard to wild animals, including the highly endangered, the correct policy is to "let them be!" (p. 361). If we respect the rights of the individual, it is held, it should be apparent that the species will in turn benefit.

Environmental ethicists, on the other hand, view the individual as transitory, appearing on the stage of life for but a short time as the carrier of but a small portion of its taxon's genome, essential however

to the continuity of its kind over the vast expanse of time. Although finding the concerns expressed for individual welfare commendable, environmental philosophers hold that individuals “do not endure long enough in terms of preservationist time scales for any efforts at this level to be of much consequence” (Hargrove, 1989, p. 128). In addition, since a species cannot experience pain or pleasure, an ethic based on individual rights does not entitle it to moral consideration. Absence of any entitlement for plants has been cited as another shortcoming of rights philosophy. As summarized by Norton (1986, p. 275), “Attribution of rights to other species (than humans) are, at best, useful as an expression of moral concern and commitment or as a forensic device. But they provide no theoretically defensible basis for species preservation.”

Zoos are philosophically more closely aligned with environmentalist than with rights advocates in that they attach higher value to aggregates such as taxa or ecosystems than to individual animals. Captive breeding efforts seek justification on the basis of a need for intervention to forestall extinctions (Hutchins and Wemmer, 1991), and this requirement is held to be ample reason for the frequent violations of individual interests, such as euthanatizing unneeded individuals (Lacy, 1991). Just as disease and predation act as agents for maintaining the viability of wild populations, zoo managers have embraced the role of selecting agent in the captive sector, determining on the basis of genetic representation, health, age, and various other criteria who shall live and who shall die.,

Despite the view that adherents of these conflicting value systems have little prospect of living happily ever after, it is imperative that dialogue continue if for no other reason than to find common starting points for debate. Perhaps the words of Hargrove (1992) can serve as a guiding principle, namely that “The resolution of the controversy is not simply a matter of finding a winning argument, but of finding a position that all those concerned about the environment can understand, feel comfortable with, and apply in their professional work and their daily lives” (pp. xxii-xxiii).

Before raising some examples of how these conflicting values come to bear on the activities of zoos, I would like to emphasize that zoos are but a small, perhaps even minuscule example, by comparison, of a very broad spectrum of cases in which the same issues are in evidence.

Two examples come readily to mind, namely restoration ecology and the practice of sustainable utilization.

Restoration ecology is the attempt to restore to their former pristine state habitats that have been decimated by human activity. It takes many forms, from replanting of timbered slopes to the cleansing of polluted rivers. Germane to this discussion is the introduction by humans of alien species that have, over time, resulted in major modification of original habitats, in particular the near extinction of endemic wildlife. An example is the French subarctic island of Kerguelen, to which domestic cattle and cats, the brown rat and several other alien species were introduced by seal hunters and whalers during the 19th and early 20th centuries.

These introductions resulted in significant modification of plant communities and in the near extinction of native fauna such as the burrowing petrel. To restore the ecology of Kerguelen and other islands in the area, various campaigns for eradication of alien species were introduced in the 1950s and 1960s, including the shooting of thousands of feral cats and introduction of fleas carrying the myxomatosis virus to eliminate rabbits (Chapuis et al., 1994). Any number of examples closer to home, in which shooting, poisoning, or biological agents have been used to exterminate alien animals could be cited (see, for example, Atkinson, 1989).

Sustainable utilization, embraced by major conservation organizations such as AWF, WWF, and IUCN, cannot fairly be depicted as a program designed to look after the interests of individual animals. Quite the contrary, it is an approach which endorses culling at levels that prevent the habitat from being overwhelmed on the one hand, but which insures that wild populations will remain viable on the other. In the case of the African elephant, a number of countries in the southern part of the continent had painstakingly evolved programs for harvesting elephants, using funds derived therefrom to protect wildlife generally. The total ban on trading in elephant ivory is held by these countries to be disastrous for future conservation efforts. The ban on ivory trading was ostensibly to save elephants from being extirpated by poachers. Yet, many have argued that in fact its rationale eventually shifted to emotional appeals based on the "right" of elephants to exist. Advocacy on the grounds of saving individuals generated the fear that, ultimately, any other position on the part of

conservation organizations would result in disastrous losses in membership and in revenue. This position was adopted despite continuing espousal and implementation of the sustainable utilization doctrine in other cases. The journalist Raymond Bonner in his book "At the Hands of Man" (1993) portrays the people living at ground zero, so to speak, as having their crops destroyed, their lives increasingly endangered, and their rights violated from a burgeoning elephant population. Bonner's essay presents several examples of local efforts to find accommodation between wildlife and poverty stricken tribals, all based on a system of population regulation (of animals only) through cropping.

This case illustrates how animal rights philosophy, as articulated by Regan (1983), for example, can join in supporting efforts to end poaching, not because elephant extinction is morally indefensible, but because of concerns about their suffering at the hands of the poacher.

ZOOS AS CONSERVATION ENTITIES VS. ZOOS AS INHUMANE KEEPERS OF WILDLIFE

Ascription to the view that pain is evil leads to behavior that would minimize its occurrence, and would do so wherever the potential for experiencing pain is found. As summed up by Callicott (1980), moral agents should therefore, among other things, "cease to eat the flesh of animals, to hunt them, to wear fur and leather clothing and bone ornaments and other articles made from the bodies of animals, to eat eggs and drink milk, if the animal producers of these commodities are retained under inhumane circumstances, and to **patronize zoos (as sources of psychological if not physical torment of animals)**" (p. 317, emphasis added). Clearly, zoos are viewed by many as facilities that deny animals their freedom, subject them to spatially restricted and sterile living environments, expose them to invasive physical manipulations, and often result in the loss of species-typical behaviors. According to Fox (1986), scientific director for the Humane Society of the U.S., zoos are places to visit if you want to see unhealthy, neurotic animals, many of which are disabled by learned helplessness, and which are mere caricatures of wild conspecifics. They give visitors the wrong message, namely, that abnormal behavior is the norm, and that domination of animals is a cultural ideal. Like others who find captivity for wild animals distasteful, Fox advocates reliance on films as a better way for urban-living humans to experience wild animals. Given

that it is sometimes associated with violence, it is not known whether he would advocate that humans should experience sex in the same way.

To these may be added the notion that elevation of humans to the role of primary agent of selection results in an inevitable domestication process which, given enough generations, may leave scant resemblance between the captive animal and its wild counterpart.

In reality, however, the lines between captive and wild have become somewhat blurred in recent years, particularly in the case of wildlife "imprisoned" in sanctuaries and reserves. Here, too, freedom of movement may be limited to small and frequently overcrowded ranges (e.g., Amboseli National park), and the growth of ecotourism insures a daily invasion of visitor-laden vehicles that disrupts their solitude, checks their movements, and sometimes interferes with their pursuit of food. These are environments in which the unchecked growth of lion populations results in an imbalance leading to the demise of a subordinate carnivore, the cheetah. In the Aberdares of northern Kenya, the beautiful bongo antelope is near extirpation for the same reason. Some would hold that arguments against zoos that are based on the evils of captivity are somewhat less convincing in light of these realities.

It has also been suggested that the harshness of captivity is mollified by the fact that the majority of zoo-living animals are now captive born, meaning that they have been accustomed since birth to the restricted environments of captivity, and therefore respond quite differently in terms of flight/fight responses or tolerance of potentially unpleasant stimulation than an individual that began its life in the wild. Unless specially prepared, captive born individuals, may, furthermore, be ill equipped for survival in a natural milieu, underscoring the naivete of those who would like to open the cage doors and set them free. Attempts at reintroduction of captive born cheetahs to wild habitat in southern Africa, for example, have been notable failures, in large part because they had not learned to recognize lions as predators, and were killed.

Inaccurate notions about wild and captive animals may be a symptom of generations of living in urban environments, far removed from anything more than transient and superficial contact with the world of nature. Nature is often portrayed as edenic and friendly, when in

reality it entails a continuous struggle with predators, disease, starvation, drought, and the extremes of climate. We may wonder if much thought is given, despite the easy access to televised episodes of this struggle, to the fact that a gazelle must be constantly on the alert for predators, may be forced to flee at top speed to escape being the lion's next victim, may have its dependent young slaughtered before its eyes, and must conceal any physical weakness, including pain, to avoid being targeted for the next kill. In a reversal of the conventional wisdom, Sagoff is quoted (Callicott, 1986) as stating that if one truly cares about animal pain and suffering, the best thing for wild animals would be to remove them to the protective confines of zoos!

The value of captive breeding and the fate of wild animals that are maintained in zoos for this purpose probably lies somewhere between the caricatures provided by their partisans on the one hand, and their detractors on the other. Although a handful of species survive today only in zoos, zoos' ability to take endangered species a step or two back from the brink of extinction is probably overstated, and their success in fostering values favorable to preservation of wild forms is not easily measured. On the other hand, much of the criticism of zoos appears to rest on outdated notions of what they are like, and on emotional rather than factual characterizations of captive living environments.

THE APPLICATION OF INVASIVE METHODS TO THE CARE AND PROPAGATION OF CAPTIVE WILDLIFE

It would be inaccurate to suggest that, despite improved health, nutritionally superior diets, absence of predation, protection from the excesses of heat and cold, and increased longevity, the zoo environment is therefore an environment free of stress. In fact, some of the activities of zoos espoused in the name of captive propagation have been condemned as "a moral atrocity" (Varner and Monroe, 1991). Among the practices mentioned by Varner and Monroe are euthanization of genetic surplus, embryo transfers between species, injections to superovulate females, and double-clutching. They conclude that, "From a sentient perspective, even if a species is going extinct in the wild so that captive breeding is the only possible way to preserve it, it is still difficult or impossible to justify captive breeding the remaining individuals" (p. 28). Others concerned with animal welfare hold that captive breeding cannot possibly be good when viewed from the

perspective of the individual animal (Regan, 1983), and that extinction is preferable to an existence only in a captive situation (Jamieson, 1985; Fox, 1986). How meritorious are these claims? And, insofar as they inflict suffering on the individual that is being manipulated, does not the end justify the means which, in this case, is the increased prospect of species survival?

Animals in both wild and captive locales develop cancer and diabetes, contract infectious diseases, become parasite infested, and suffer from wounds inflicted by their conspecifics. In zoological gardens, not a day goes by but that hundreds of ailing individuals receive treatment designed to cure their illnesses and in many cases save their lives. What could be more noble? Yet, given human propensities for becoming immunized to suffering, do not the assertions of Varner and Monroe merit examination?

Consider that a young chimpanzee, unlike its human counterpart, cannot be made to understand that the pain of its medical experience is for its own good. It will be captured, anesthetized, and wake up in a recovery area that is strange and far removed from its familiar surroundings. The struggles of a wild animal succumbing to and recovering from anesthesia cannot be passed off as of no consequence. The individual does suffer, witness the fact that it quickly learns to react to the sudden appearance of extra personnel and the sight of capture paraphernalia with unmistakable signs of fear and avoidance. And the effects of separation from cagemates and kin, leading to greatly heightened agitation and eventual depression, are commonly seen during hospital stays, especially in the highly social primates.

Quarantine is, by definition, isolation in a sterile, easily sanitized (therefore, hard and cold) environment for a minimum period of 30 days, during which it receives the minimum treatment necessary to sustain life (e.g., food, shelter, and temperature control). The quarantine experience is as frequent as the act of transferring animals between institutions or countries.

The practice of animal medicine has been largely immune to outside scrutiny from the standpoint of pain and suffering, since intervention is widely accepted as an obvious necessity and because the practitioners are themselves regarded as the highest authority. Quarantine cannot be abolished if we are to have captive animals, but one might

argue that steps could be taken to soften the impact of this experience. The immobilization of ill or wounded individuals is a necessary form of intervention, but perhaps this highly stressful act should be undertaken only as needed to restore health, not as a routine search for potentially harmful pathogens. Hospitals are anthropomorphic in design in that those needing treatment, however minor, are funneled in from all corners of the institution, and held in a strange and odious environment as long as treatment and surveillance of recovery is deemed necessary. Is sufficient thought given to the possibility that some forms of health care may be taken to the animal, so that it is treated in a familiar environment, or to reducing hospital retention time that is dictated by convenience to staff rather than the animal under treatment? Recognition should be given to the fact that the hospital experience for a wild animal can never be pleasant, only more or less tolerable.

A second category of stressful experiences that have been brought into question arise from the practice of what has come to be known as "assisted reproduction." Semen collection via rectal probe electrical stimulation, or the scrutiny of female organs via laparoscopy, or the flushing out of embryos for cryopreservation or in vitro fertilization, are all carried out under anesthesia. These are the acts of front-line news stories, the application of human ingenuity to the development of new techniques of propagation in a world where natural processes are often compromised. As in health care, these acts of immobilization are stressful, and are carried out without the comprehension or cooperation of the animal whose representation in future generations is at issue. Although there is no public score keeping, those on the inside will acknowledge that an individual "used" in assisted reproduction may be subjected to dozens upon dozens of such procedures. Are those who react with concern about the quantity of stress and distress visited upon the animal in these programs merely emotionally misguided, or is there a question of ethics that needs to be examined?

Before leaving this subject, it is necessary to point out that the same or similar procedures are increasingly common in the study and management of wild populations. Individuals of a given species, for example, are darted with anesthetic projectiles to enable the procurement of tissue samples for laboratory analysis or to collect biometric data that is applied to their long term management. Some conservationists envision a time when gametes rather than whole animals will be trans-

ferred between fragmented wild populations in the interest of maximizing genetic diversity. Relevant here, also, is what some would characterize as the ultimate indignity, namely the removal of their horns with chain saws to immunize wild living rhinos to poaching. Such actions unquestionably bring into conflict those who value the species' long-term survival with those concerned about the discomfort attending the use of invasive procedures.

If the morality that guides human interaction with wild animals is the minimizing of pain and suffering, it is quite obvious that in both captive and natural milieus much must be left to fate. This would seemingly be a scenario that will result in the demise of a very large number of wild forms. If, on the other hand, the long term view of providing continuity between generations is a practical if not moral imperative, then tolerance of some measure of suffering and sacrificing of individuals must be accommodated.

THE FATE OF CAPTIVE ANIMALS THAT ARE NOT ESSENTIAL TO CONSERVATION (IE., THE SURPLUS PROBLEM)

There is unanimity among zoo professionals on the point that captive breeding programs unavoidably generate a population that becomes surplus to their conservation endeavors. The notion that individuals become surplus needs emphasis in order to counter the notion that surplus animals result only from unnecessary and wanton breeding, and that the problem would go away if zoos merely practiced restraint (see Grandy, 1989, as an example of this position). Because the size of the captive population for a given species is the minimum deemed necessary to preserve acceptable levels of genetic diversity, the rules governing small-population propagation come into effect. That is, special care must be given to the number of founders at the outset, and to the genetic representation of given individuals in the captive gene pool subsequently. Put simply, to maintain the steady state in population size, dictated by the captive space available to the species, a point is reached where each member of the population is allowed to breed only to the level of replacing itself in the next generation, usually from two to three offspring per parent. Consequently, in the case of an animal for which 10 to 15 offspring is a lifetime norm, its genetic quota may be reached while it is still relatively young and expected to survive, let us say, for another 15 to 20 years. To be free from the burden of long-term care and feeding, the view held by a majority of zoo

professional is that these surplus individuals should be euthanized in order to free up resources for the future propagation of their own or other species (Lacy, 1991). Individual interests, in other words, may be sacrificed to the greater good of perpetuating the taxon to which one belongs. Interestingly enough, at present zoos use an hierarchically ordered approach in dealing with this problem, such that surplus gorillas will be readily euthanized, but surplus zorillas will not. This position rests not on a carefully reasoned set of values, but on a pragmatic approach to what public sentiment will allow.

We have elsewhere attempted to deal with both ethical and pragmatic aspects of this problem (Lindburg, 1991; Lindburg and Lindburg, 1995), and will only summarize a few of our main points here. We have taken the position that an hierarchical approach is unworkable precisely because it rests on a sliding scale of valuation, and that at least at the present time there are appealing alternatives to euthanasia such as the construction of retirement facilities, alternative benign uses of surplus individuals, and conversion of scarce space in zoos from species not in need of captive propagation to those that are. Implied in this approach is the belief that zoos may ultimately have to act against the interests of individuals, but that a reordering of priorities and development of new initiatives have the potential of accommodating both individual and species interests.

To these earlier discussions may be added the prospect of manipulating generation times in steady-state populations, such that genetic contributions are spread over the lifetime of individuals rather than being concentrated in the early years of life. The process of producing replacement offspring is, in other words, slowed down in relation to the projected average life span for a given taxon. While morally more acceptable, this scenario entails a bit of a gamble that animal "x" will not contract a fatal illness before it has its opportunity to reproduce in the later stages of reproductive life. And for species such as the highly social primates whose young are dependent on age-mates for socialization, this approach would produce the equivalent of human youngsters growing up in a world of adults only.

To conclude this point, we reiterate our statement from the Atlanta Conference (Lindburg and Lindburg, 1995) that accommodation between the often competing need to respect the welfare of individuals and to preserve species derive from the realization that "humans stand

apart from the rest of the biological world in terms of conscience and moral responsibility. As Rolston has put it, Humans are in the world ethically as nothing else is (1989, p. 238, original italics). It follows that in exercising our judgements we must act honestly and responsibly, and in the present case this means that we must pursue the unrealized options that are available to zoos in dealing with healthy surplus animals."

CONCLUSION

It cannot be denied that, left to themselves, many species will disappear from our planet in the decades ahead, or that the vast majority of these extinctions will be due to human activity - so aptly described by Rolston (1985) as "super killing by a super killer." Nor can we deny that if this trend is to be slowed, human intervention is required. Wherever they go, humans have a degrading impact on the natural world. Being a culture-bearing creature means, among other things, having a unique capacity for modifying the environment, usually at the expense of natural processes and natural systems. Who can doubt, for instance, that the role of natural selection is lessened because it operates in a world increasingly shaped by human decisions as to what shall be? Having arrived at a point where the impact of humankind on the natural world is so pervasive, we cannot but acknowledge that we are henceforth deeply involved in determining the future of this planet, for good or bad. Playing god is something we have been doing from the first appearance of culturally patterned behavior. Now, the question is, given this capability, what kind of world we will settle for, not what kind of world we want.

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LINDBURG DISCUSSION

Pacelle: I take issue with a number of points in Lindburg's paper. I found the early part of his work to be a manifesto for intervention with respect to ecosystems, captive breeding programs, etc. as well as what we should do with individual animals in zoos. I agree that there should be intervention, but the questions are when and how.

I would like to make a point about conservation, biodiversity and environmental advocacy. It seems that, with the exception of captive breeding and important international research work the zoo community is not really at the forefront of the conservation movement. When I think of the major domestic environmental issues in this country I do not see the zoo community there. The zoo community has an international bias but is not strongly involved in national conservation, just as the animal protection, welfare and rights community has historically not done much about habitat.

There are three other issues I would like to touch on. Lindburg brought up the phrase "restoration ecology," and spoke about the eradication of exotics in particular areas where they are having a detrimental impact on the global ecological community. When we have questions regarding exotic animal management it is not an all or nothing game. More and more we are taking each of these cases on an individual basis. There is not a categorical opposition to control exotics. One example is the pig situation in Hawaii. The state is engaged in a campaign to eradicate pigs through the use of neck snares. There are very compelling reasons to eradicate pigs from that ecosystem; they have been brought there in the last few centuries and are having a negative impact on the landscape. PETA does not oppose this killing of pigs. They object to the use of neck snares and urge the use of a more humane way of eradication. Another example is the mountain goat population in Olympic National Park. There is controversy as to whether the goats are native to the peninsula. There is not a scintilla of evidence that mountain goats are a peril to any native plant species in the national park, yet there is this great push to eliminate them from the environment. We need to look at the justification. Just because they are exotic does not mean we should eliminate them through inhumane methods, which at this time is the only way that mountain goats could be eliminated.

Lindburg embraces the principle of sustainable utilization of wildlife. The zoo community's focus on population leads to this idea of sustainable utilization, which I feel is a tremendously detrimental impact on the welfare of individual animals. One could make the argument that whaling can be done sustainably and that whales can be killed in a manner that is regulated and will not peril the existence of certain whale species. I find the idea of killing whales entirely repugnant, even if some economic benefit could be derived from the activity. Questions about wildlife management have to involve this critical question of ethics and the treatment of individual animals, not just sustaining the population for future generations. The state of Alaska is killing wolves to create a giant game farm. This may not imperil the wolf population, but what does it say about the "wild?" What does it say about allowing ecosystems to function and predator/prey relationships to exist? This is a perfect example of sustainable utilization.

Baker: I do not look at this as individual versus population, for we cannot preserve populations without preserving individuals. I look at it as conflicts that are better defined as conflicts between individuals. A weighing of individual interests is necessary for a solution.

Many of us view animals in captivity as ambassadors for their species. It is not in their best interest to be in captivity, but in the best interest of a number of other animals in the wild.

Another conflict is where actions are in the best interest of future individuals. We look at what goes on with animal behavior and we see they place a great deal of importance on the continuation of their species. For example, there is a small Australian carnivore called antichinus, one of the few mammals that breeds once and then dies. If you prevent the male from breeding they live much longer. Yet they choose to breed and die rather than live longer. They display a strong desire to preserve the species.

The real issue is not what rights animals have, but what value they have. I would hate to see an argument that rights are dependent on cognitive ability. A number of things are worthy of value, including biodiversity and invertebrates.

Lindburg: The paper was not meant as a blanket endorsement of sustainable utilization. We must remember that the world today is not

as it used to be. Many of the natural checks and balances that would limit a population are no longer in effect. We have created this situation. One of the major examples of the dilemma we face with surplus animals in zoos is that of the orangutans. It has been decided to manage the eighty-eight hybrid species to extinction. The cost to keep these animals as we do now for the remainder of their normal lives comes to approximately three and a half million dollars. I hope there would be less expensive alternatives, for example warm climate retirement communities could be built at much less cost.

Pacelle: I appreciate your qualification on the sustainable utilization issue. You seem to define it in the text as a response to the overpopulation of animals. I think more and more it is defined by country and state as a means to generate income from the use of wildlife, whether or not they are an abundant population. The state fish and game agencies treat deer and other species as if they are a crop to be harvested every year and that we should derive certain recreational or economic benefits from them.

Robinson: I would argue that zoological parks have been unprecedented in their allocation of resources for the conservation endeavor. Zoos have a unique capability to address certain kinds of conservation problems and they tend to do those rather well. They tend to come out of a technological, scientific, problem-solving orientation. Increasingly in the conservation field implementation of conservation projects is being taken over by zoo-based conservation organizations.

de Boer: Zoos are one of the few institutions focused on the global perspective of conservation. It would be fine if more action was taken on local conservation issues but the global situation is extremely important. Apart from the zoo world, there is no comparable network, nothing that like the zoo network can so efficiently teach people in Europe to be interested in rain forests in Brazil, or that North Americans should work to save the forests in the East of Europe.

Robinson: Zoo conservation efforts have tended to be very divorced from collections. There has been an interesting debate within the zoological community whether or not to focus on domestic conservation issues. For the most part the argument frequently is that, in the United States, there are a lot more resources going into domestic conservation than international conservation.

Jamieson: When we breed animals and endangered species and then kill them we violate a trust with the animal and with the public. The cost of that radically outweighs any relatively minor concerns about whether a small amount of money could be best spent in one way or another.

Hutchins: Regarding what Pacelle said about mountain goats, I spent five years studying those animals. I do not buy the evidence that they were there before 1920. A lot of times there is reaching from the animals protection community to find evidence to support their point of view. The goats are not threatening all the plant species in the park. However, the environment has definitely been influenced by the introduction of this species. We should be looking at more humane ways to control them but I consider introduced species to be one of the top two or three ecological problems we have in the world today.

Pacelle also stated that zoos are not major players in conservation. I would turn that around and say that animal protection groups are not major players in conservation. I would like to see a more responsible approach to conservation by the animal protection community. We would like to work together with them on these things. The AZA is very active in conservation.

Clifton: Roadside zoos are often run by people who were once employed by a zoo or circus but were let go as new legislation arose. Many of these people have the "old" mentality regarding animals and their care. A lot of them have no alternatives to make a living and have opened their own operations.

We need to educate the public about what a credible zoo is and sensitize them about what is bad about roadside zoos. It is possible to pull roadside zoo operators back into the network. Have these people take care of some of the surplus animals now living in zoos, set up terms and contracts with them and follow through on inspections. Provide a stipend for the care and feeding of the animals. Such a program would still allow the operators to make a living while giving us control over the roadside zoo situation.

Grandy: I find the discussion of exotic species to be a huge issue. It extends far beyond wildlife in every dimension. The United States is full of exotic flora and fauna. I overheard a discussion earlier regard-

ing “good” animal surplus versus “bad” surplus. Good surplus came out of carefully engineered captive breeding programs while bad surplus is animals produced as a result of sloppy management, sloppy animal husbandry. There is a huge difference between the two. We ought to do everything in our power to prevent the production of bad surplus.

Pokras: I would like to put myself forward as an advocate for selective euthanasia. It is a very sad and sobering thing and one wonders what decision is appropriate. For example, a bird gets hurt but can be saved through surgery. However, it will not be able to fly again. What should we do? A lot of this depends on the quality of the facility where we can put this creature. If I could find nice homes that would provide care and nutrition I would feel great. I end up killing about one thousand animals per year. On the large scale I feel okay about doing that, for it is in the interest of the animal’s well-being to kill it. To keep it alive and put it in a less than adequate facility would be inhumane. As we get better with our medical and surgical techniques we may not have to euthanize as frequently, but we still will not be able to save them all. Death needs to be discussed openly and the value of death education acknowledged. I really think it is sometimes more humane to give an animal the quiet and comfort and finality of death than to put it someplace we know to be less than optimal.

ANIMAL WELL-BEING IN ZOOS, CONSERVATION CENTERS AND IN-SITU CONSERVATION PROGRAMS

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INTRODUCTION

Well-being, as defined in reference to one's welfare, is the condition of happiness, prosperity and good health. In dealing with an animal's well-being, there are two frames of reference to consider. First, biological well-being which encompasses the spacial, social, nutritional, behavioral and reproductive needs of a species. Secondly, cultural well-being which reflects how human beings interpret the state of well-being of animals concentrating on their perception of happiness, cleanliness, safety and the way the animals are treated by the people who care for them.

In this paper, we are not addressing freedom as a condition of well-being, only happiness, prosperity and good health. Free-ranging wild animals are not free but are restricted by consideration of space, time and individual relationships (Hediger, 1969). We will look at animal well-being under these restrictions and discuss the effort needed to maintain well-being, as the level of constraint imposed by man on animals increases, and natural surroundings give way to artificial enclosures.

To look at animal well-being under different management schemes, we first need to define the level of confinement addressed in the paper.

In Situ

In situ refers to populations of animal existing in range states where they naturally occur. Usually the animals are inside a national park or wildlife reserve where they are afforded some protection from human activities.

Intensive Protection Zones

An Intensive Protection Zone (IPZ) is an area, usually within government wildlife department lands, in range states into which individuals of a threatened species are concentrated. The area is strategically defined by fences, guard posts and natural barriers. The animals inside IPZs are afforded greater protection from man-induced mortality by the presence of a large, well-trained unit of wildlife guards. The IPZ connects to a larger wildlife reserve into which the animals can be moved after the threats of their survival have been controlled or eliminated.

Conservation Center

A conservation center is an institution outside the range states that maintains animal species in semi-natural conditions with the emphasis on scientific management to aid their survival. The overriding premise is one that puts the needs of animals first. Usually, they are not open to the public and any viewing of animals is strictly controlled.

Nature Center

Nature centers exhibit native fauna in very naturalistic surroundings in an effort to educate the local populace about their indigenous plants and animals. Nature centers concentrate on topics related to ecology and man's relationship with wildlife on a local level.

Zoos

Zoos exhibit animals in artificial environments meant to depict the animal in a resemblance of its natural habitat for educational and recreational objectives. Progressive zoos dedicate resources to off-exhibit breeding and research programs and make each exhibit as natural and representative of the local habitat of the species maintained as is possible. There are different levels of accomplishment in zoos in reaching the goal of naturalistic display of animals and having outreach conservation and breeding programs. I have arbitrarily divided zoos into progressive zoos, good zoos, and bad zoos based on their respective level of naturalistic exhibitry and the attention paid to well-being in providing for their animals.

Biological Well-being

Each species has specific biological needs that need to be fulfilled for it to survive and reproduce. For most species, these biological needs are known and documented. How and where these biological needs are satisfied determines the level of well-being a species can experience in different environments.

For each species, biological and behavioral needs should be prioritized to reflect the most important needs necessary for survival. From this list, a profile of essential needs can be developed that must be met for basic biological well-being. Like essential vitamins or amino acids, certain biological needs must be present for biological survival. These must be satisfied in all instances. Other biological needs are less critical to survival but do play an important role in providing increasingly better living conditions for the animals (i.e., well-being).

Based on these parameters, the in-situ animal populations would possess the maximum amount of biological resources needed for biological well-being. These biological resources would steadily decline as we put the animals under increasing levels of confinement. As the natural sources of biological well-being pare away, man attempts to substitute them to maintain the animals well-being. As the animal becomes more confined, man substitutes hay for natural grasses, prepared meat diets for carcasses, culverts for dens and concrete pools for lakes. This is all done to maintain biological well-being. How successful we are in providing for biological well-being depends on how well we understand the biological needs of the species and how well we provide for their biological needs within different levels of confinement.

Cultural Well-being

Cultural well-being is reflected in how human beings interpret the state of the animals well-being in relation to its living conditions. This is essentially done by asking the question, "Is it happy?". Happiness being an essential part of well-being, along with prosperity (offspring?, territory?) and good health.

These are some generalizations that I have encountered over the years observing the relationship between people and wild animals held in

captivity.

People seem to sense an animal is happy when:

- it has a reasonable amount of space to live in.
- it is living in a normal social grouping of conspecific
- it is in a habitat that resembles its natural home.
- the food provided resembles its natural diet.
- the environment is clean
- the environment is safe and secure.
- they do not look or act bored.

Cultural well-being takes the biological needs of the animals and injects into them human ideas about happiness and examines how they are reflected in the animals environment and its behavior.

Different levels of confinement provide more or less of the factors humans expect to find in the environment and in the animal that make it appear happy. We will now look at these factors in relationship to varying degrees of confinement.

In people's minds, an animal can never have too much space, for people equate space with freedom. But when people come to view wildlife, they expect the animals to be easily observed. In a national park or wildlife reserve, this is accomplished by conditioning the animal to tourist vehicles or boats. This can be done because the animals are protect by law from harm by people and quickly become used to another neutral entity in their lives. Some animals even use tourist vehicles for their advantage as evidence by cheetahs in the Masaii Mara who use land rovers as elevated observation points from which to look for suitable prey.

In an IPZ, and to a lesser extent in conservation centers, suitable space is provided but with little emphasis on visibility and greater emphasis on protection. The goal here being to increase and maintain a fragmented population at all costs. Poaching, disruption of behavior and harassment of the animals is strictly forbidden. Great efforts are made to insure the protection of these animals as is the case with IPZ's for black rhinos in Zimbabwe where poachers are shot on sight.

Zoos must provide viability by design. They are in business to exhibit

animals. The space allocated to each species should be the maximum available to satisfy biological and cultural demands of well-being. This requires innovative and costly exhibits. More importantly, it requires careful selection of species which are exhibited, making sure their allotted space is biologically and culturally perceived as adequate. If this cannot be done, they should not be maintained until quality space can be dedicated to their zoo home range.

In regards to social groupings, surrounding and food, wildlife reserves provide the best balance of these needs. As we confine the animals into smaller spaces, we need to provide as natural a situation as possible. IPZs and conservation centers stress the importance of these factors and integrate them into their overall management. At the zoo level, the more that appears natural in the animals lives the more people will perceive the animals are happy and prosperous. Selection of species that can be afforded properly constructed exhibits, allowing a natural lifestyle, will go a long way in presenting a positive image to the visiting public. Even if the above natural factors are met, there is still a need to consider boredom as a factor affecting people's perception of happiness in animals. If an animal is not provided with a proper environment and looks bored or sad or displays stereotypic behavior, the public will respond adversely. These behaviors are unnatural responses to an artificial environment. An improvement in space, habitat quality, food sources, the number of conspecific and health care usually will eliminate these negative behaviors. If these improvements in the quality of its life do not change the negative behaviors then most likely this individual/species should not be kept at the zoo level of confinement. Preferably, if needs to be maintained only in conservation centers where the more abundant semi-natural environments can help to eliminate destructive behaviors. Even in certain cases, the conservation center may not provide enough resources for well-being and the animal should be maintained only *in situ*.

Safety, security and cleanliness are uniquely human responses to living in this world. Animals do not worry about their safety, they go about their lives concerned about living, not worrying about being injured or killed. Many species of mammals and birds clean and groom themselves and some animals keep their den sights clean, but most go about their lives not overly concerned with a clean home range. People are concerned about unclean environments because of the relationship to

disease. The impact of waste on a restricted environment is well known. People like cleanliness and an animal in a clean environment makes them happy so they feel the animal also must be happy about it.

In regards to these factors, there is a reversal of which level of confinement provides the best situation for animals as people see them. In situ areas provide little security or cleanliness as people want it. Natural factors such as predation, disease, starvation, intra-species aggression, along with human poaching, hunting and harassment take a heavy toll on individual animals living in wild places. IPZ and conservation centers provide protection from certain types of harm like poaching, harassment, starvation and at time, predation and disease. Intra-specific aggression and some health related problems related to large areas and limited observation of animals will still occur. Zoos do provide the best security and the cleanest environment for animals. Most of the *in situ* mortality factors can be eliminated by the extensive care and protection provided in a zoo situation. Two factors that contribute occasionally to making a zoo environment unsafe for animals are accidents; usually due to small spaces, poorly designed facilities or improper care and vandals.

Because of this improve security and cleanliness, zoo animals live much longer than wild animals. This is both a blessing and a curse. Long-live animals produce more offspring over their life-time. They also must be expensively maintained well past their reproductive and even exhibit value years. here again, the perception of happiness depends on the quality of life than on the quantity of years. Zoos must be prepared to provide quality environments and care for all their animals for their entire life if they are to be perceived as providing conditions conducive for well-being. Aged animals, like aged people, deserve special care. Planning for their retirement needs to begin while the animal is young.

If a wild animal is perceived by people to live in natural surroundings, in natural social grouping, eating natural looking food in a large area but still visible and the area is clean and safe and it does not appear bored or sad, then the animal must be happy. If wild animals are treated at all like we treat domestic animals, people consider the cruel. We must remember that wild animals did not ask to be confined and in providing for their care we are held to higher standards than those deemed acceptable for domestic animal management.

Standards

Now that we have looked at what well-being means for animals both biologically and culturally, how do we attempt to provide animals with a state of well-being as their level of confinement becomes more artificial. One way is to develop standards that guide people in developing the proper environment for animals that not only provides for but also fosters well-being.

A standard is defined as a grade or level of excellence or advancement generally regarded as right and fitting. For each species to be managed in confinement in zoos or conservation centers, a set of standards should be developed by a committee with representation coming from a diverse audience such as that represented at this meeting; biologist, zoologists, curators, philosophers, behaviorists, animal protectionists, field researchers and administrator.

The American Zoos and Aquariums Association through Species Survival Plans, (SSP) provide expertise in genetic and demographic management of a captive population. What is greatly overlooked is the consideration of what each species needs in captivity to experience well-being.

In SSP master-planning, a husbandry manual is formulated which describes certain standards to maintain a species in artificial environments. I have attended several of these planning sessions and feel it is detrimental to develop of these so-called minimum standards. It is a contradiction in terms if we define a standard as a "level of excellence generally regarded as right." How can providing the minimum to house a species in captivity be promoted? By basing our present standards on the status quo which includes some deplorable facilities for certain species, the zoo community leaves itself open for justly deserved criticism. Husbandry manuals fall short because they describe what is being done now, not what should be done for the animals to raise their standard of living to a level where they can experience a state of well-being. The standards for management of a species in captivity should stand by themselves, be emulated, be goals to reach for. For the sake of discussion, let us call them optimum standards of confinement (OSC). These OSCs, if set by a multi-disciplinary committee, should satisfy the biological needs of a species and our culturally

based response to how those needs are being satisfied. By doing this, a new dimension of performance would be created which will raise animal care to species care. These OSC's will allow for animal well-being to be the driving force of captive conservation programs because it sets forth the level at which an animal can be satisfactorily maintained and experience well-being in different degrees of confinement. Just managing numbers and space allotment, removes dignity and well-being from the equation. When well-being is considered first, then the number of suitable spaces will be real and the numbers of animals that can fill those spaces will be real.

The decision to maintain animals in conservation centers or in zoos should be linked to a percentage of compliance with the OSC as determined by the committee. For instance, if the committee determines that 75% compliance with the OSC for species "A" provides adequate resources for a state of well-being in a zoo setting, then zoos, realizing that level of compliance could exhibit animals of species "A" while continuing to strive for a complete realization of OSC for that species. If a zoo could only attain 60% compliance, they could not maintain this species until they had brought their facilities up to the 75% compliance level.

At this point, I would like to run through an example of setting an OSC for an animal I am very familiar with, the okapi (*Okapi johnstoni*).

BIOLOGICAL NEED

Okapi are forest dwellers that need shade and cover.

Range over a relatively small area (2km²) in the wild.

Solitary except for mother w/ calf, female territories overlap, males wander through the territories of several females.

RESPONSE IN CAPTIVITY

Trees in pen, areas with thick brush and shrubs. Access to shelter at all times.

Need 1 acre per animal which is heavily wooded.

Can exhibit alone, preferably with a neighbor or a male/female companion.

Eat leaves from 125 species of trees, spends 12-14 hrs a day eating.

Provide browse, several times a day, good diet of hay, grain and vegetables.

Drinks water frequently.

Fresh water always available.

Mother spends very little with her calf during the first three months.

Provide separate calving areas w/ multi-stall/pens for mother to avoid calf except for nursing.

Sensitive to loud noises.

Locate away from sources of loud noises, provide place to hide when frightened.

Sensitive to cold.

Provide heated winter quarters.

Male needs to remain with females for 24 hours during estrus.

Provide for 24 hour watches during estrus.

Does not like rain.

Provide shelter.

Does not like insects.

Spray for insects, provide insect proof quarters.

Lives for 25 years.

Provide for long-term optimum care.

CULTURAL NEEDS

RESPONSE IN CAPTIVITY

Clean enclosure.

Pick up manure twice daily.

Clean water

Clean waters every day.

Safe enclosure.

All fences/facilities neat and in good repair. Barriers suitable for a large ungulate.

Okapi do better if they have access to the outside year round.

Concentrate captive population in warmer climates.

Security	Locked gates, 24-hour security force, visible keeper staff.
Easy viewing.	Browse in areas close to public. Hay inside one thicket.

The okapi will be happy and the public will feel they are happy if the okapi has the above conditions provided for them. This list satisfies the spatial, temporal and social needs of the okapi; i.e., their biological well-being, as well as what people would like to see in the exhibit to satisfy their cultural view of the okapi's well-being. A committee would determine what parts of the OSC are mandatory and what areas could be escrowed for an institution to receive and house one okapi. For instance, an institution may have only 3/4 acre/per okapi available now, but more space will be made available in the future, with approval from the OSC committee they could then receive and manage okapi. But, if the area has little tree cover, more trees must be planted before okapi can be housed there. Trees being so essential for okapi well-being that no trees can not be tolerated, but a little less space is not as critical.

This process will vary with each species, but should be kept simple by outlining basic biological and cultural needs of each species. First prioritizing them, then having a committee structure a standard and decide what percentage of the standard should be required to be in place to provide confined animals with a basic state of well-being. The assumption that underlies the process is that institutions are striving for a complete representation of the OSC realizing certain aspects of the animals' needs must be present initially to provide for well-being and that less critical needs will be attended to as soon as funds and time permit. This is in their best interest since public and private notions of their operation can only become more positive as their attention to animal well-being becomes more apparent.

CONCLUSION

Recognizing that animal well-being is an important goal of conservationists, we must be able to describe well-being for each species and design a method to implement programs that provide for a state of well-being when they are confined. In this paper, I have suggested developing standard which detail optimum conditions for animal

well-being in different degrees of confinement.

Implementation of these standards will be difficult and costly. But, if we are to raise the level of care of animals confined by us for their own good, we must dedicate new resources and new energy to developing and realizing optimum standards of confinement. To raise the standards of care under different degrees of confinement requires less effort and expense in places of little confinement and becomes steadily more costly as the level of confinement increases. Here is where hard decisions lie, for if we cannot provide the standard at a certain level of confinement then the animal should only be maintained in situations of less confinement.

Until a standard can be met at a certain level of confinement, efforts should be concentrated on maintaining the species at the level where standards of well-being are already being met.

Coming from a conservation center background, I see that conservation centers have more resources available in which to satisfy biological well-being for certain species than zoos do. But, for other species, conservation centers have less resources available than those working *in situ*. Every time White Oak Conservation Center considers helping a new species, we go through our own OSC checklist to see if we can really provide for that species' well-being. Believe me, sometimes the answer is no. We may have to let certain species fight for their survival *in situ* because we can not realistically satisfy their OSC at the conservation center or zoo level. (But, we can provide *in situ* support as if they are part of our programs.) Other species may only be helped at the conservation center level which is the best level for species being considered for reintroduction attempts where they may better prosper *in situ*.

Everyone working with confined wildlife needs to consider the well-being of individual animals while we consider the well-being of a species. As the human consciousness explores more meaningful relationships with other species on this earth, the conservation community needs to be leading the way in developing a new covenant with wildlife based on dignity and well-being.

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LUKAS DISCUSSION

Grandy: This paper is a spectacular beginning for what we are trying to do, to come together. Lukas makes several critical points in his work, such as the notion that space should be the maximum available to satisfy the biological and social needs of the animal. If this is not feasible then the animal should not be maintained. A few important issues addressed were quality housing, the ability to afford animals before we bring them in and maintaining the animals well beyond their reproductive years.

This paper speaks fundamentally to the kinds of responsibilities that the animal protection community and the public see as necessary to properly care and maintain animals. We have to provide them with far more than minimum care. I heartily endorse the idea of standards. We should, in all cases, have a floor of humane care that provides not "minimally" but "fully" for the care and well-being of the animals. I do not accept the notion of settling for seventy-five percent of optimum. Seventy-five percent will never become one-hundred percent unless there is a forcing mechanism. Zoos are fraught with problems of economics and budget and place too much emphasis on variety of species rather than quality housing. We need mandatory standards to eliminate these problems.

The notion of "bad surplus" was discussed yesterday. The "good" surplus animals are brought into being as a result of our meeting what we see as our responsibility to endangered species, and we all agreed that bad surplus, that is animals produced as a result of poor facilities and poor, sloppy husbandry, should be immediately eliminated through use of contraceptives or otherwise improved husbandry and care. But we need to evaluate more critically the concept of good surplus. The word "good" is used because the animals are produced as a result of a presumably "good" purpose - that is, reproduction of an endangered species. The word surplus is used because, for example, only two offspring are needed for the program, but six are contained in a litter leaving four as so-called surplus. I think the whole use of the concept of surplus in this situation is wrong and represents an abdication of the responsibilities of those maintaining these animals. The reality here is that these animals are only surplus to the immediate needs of the endangered species breeding program. They are not, however, surplus to life. Let me repeat that these are animals

produced as a result of our decision to allow breeding, and their lives are not surplus and the animals themselves are not surplus to life. Nor are they surplus to the responsibility of those who allowed the breeding to occur to provide appropriate care and facilities for the animals. If they are surplus to adequate facilities, it is because space for them was not planned. They are not something to be euthanized, killed, sacrificed or thrown away. They are animals that need to be maintained. In short, those who take responsibility for allowing their production must take responsibility for the humane care and maintenance of offspring for the lives of the animals.

Standards would also take into account the permissibility of keeping certain kinds of animals, such as polar bears. There needs to be a fundamental re-evaluation of the permissibility of keeping some kind of animals in captivity and the kind of mechanism that Lukas describes is the way to do it. I can only say I wish I had written this paper.

Lukas: The existing AWA standards are much lower than the existing zoo standards.

de Boer: Lukas' paper could not have been better. I do have a few remarks. Optimal standards would be very welcome, however I had the impression that within European breeding programs the protocols for drafting husbandry and management guidelines are continually striding for the formulation of optimal guidelines. I have great confidence that the aspects of well-being are increasingly focused on.

Lukas described the number of aspects of okapi well-being, asserting that since they dislike insects we should spray to keep them out of okapi enclosures. I believe the experience of well-being is only possible after occasional experiences of slightly less well-being. The chasing away of insects is a natural behavior and occupation for many animals. Even if an animal dislikes insects their presence is not harmful unless they negatively affect the animal's health.

The aspects of cultural well-being are entirely anthropomorphic; cleanliness, open spaces, plants present in the enclosures. We need to take great care not to fall into too many of these traps for they can be counterproductive to conservation aims and even harmful to individuals. It has been mentioned that "active health" is very important in conservation. Such anthropomorphic views may almost exclude the building of

active health in certain individuals.

In reference to the problem of good and bad zoos, I would like to refer to the "World Zoo Conservation Strategy." I did some work on drafting this document, including a chapter on good and bad zoos. I believe those zoos that want to be part of an organization express a willingness to work towards a common future. Zoos that are organized into federations are part of an effort and are zoos with which we are able to communicate. Those outside the federations are beyond our community network and we cannot bring them to higher standards.

This type of discussion is wonderful, but at some point we need to take action. By basing ourselves on the "World Zoo Conservation Strategy" we would work together and use the community network to strive toward a common future of organized zoos of the world. Secondly, it would allow us to eliminate or phase out those zoos that do not wish to be part of a common future goal.

There is a large difference between North America and other parts of the world. Many zoos in Eastern Europe - for instance, are in a very bad state, and if we saw one here we would close it immediately. Yet, in their own countries these zoos have a very important role to play, as in the local circumstances these are the only places where the vast majority of the people can ever see a glimpse of wildlife, including even wild animals from their own country. Thus, we should be careful in our judgment.

Lukas: We must appreciate the anthropomorphic concerns but do not have to pander to them. We need to be aware of how people view animals and incorporate that into how we provide well-being.

Kaufmann: There are many organizations that are part of associations and are struggling with the problems this situation brings. Are you there to encourage and lead or to push and prod? Some associations are weaker than the parts they are there to lead.

Lewis: I think statutory enforcement is critical, for the bad zoos who pay no attention to the AZA now will pay no attention to AZA standards in the future. My understanding is that the medical research community is the strongest opponent of this. If you are willing to cut a

political deal with them, such as exempt their facility, you might be able to push it through.

Hutchins: It is clear that the goals that zoos and zoo associations are aiming at cannot be met unless animals are kept in better than minimum conditions. This goes for conservation, for education, and for science. We know that animals kept in naturalistic exhibits, natural social groupings and provided choices will be better subjects for scientific study. They are also better for educational purposes for they can present types of behavior to the general public which illustrate the connection between nature and animals. I do not believe this can be achieved in a concrete cage.

We are suffering from historical inertia. We have a lot of good ideas of where we should head, but have a lot of existing animals that are not being properly taken care of. They are in sub-standard exhibits and collections that have been assembled with very little planning. Turning that around will not be easy but must be done.

I would like to talk about some of the practical difficulties we are going to run into. We need standards. However, there are thousands of species of mammals and birds, reptiles and amphibians, in zoo collections each with specific biological needs that must be accounted for. This is an incredible task. In many cases we are operating with imperfect knowledge, with very little information to try to develop their diets, their care and maintenance standards. We know very little about their behavior. Information from the field has led to the understanding of many animals we were previously not doing well with in captivity.

In some cases it depends on who is developing the standards. Many of the standards initially developed by the biomedical community for primates were not good for the welfare of those animals. For example, if the focus is on hygiene rather than psychological well-being you end up with animals in stainless steel cages that can easily be cleaned, but do not meet the behavioral needs of the animals. In fact, cleaning a cage can actually be stressful for the animal.

The federal regulatory agencies are not only responsible for the professional zoo community and the professional humane community. Anyone who handles animals is subject to their regulations. This is a big problem. They have a horrendous task and it makes it difficult for

them to recognize certain members of the community that are striving to do a good job. It is also difficult to be specific in legislation because they have to cover such a wide variety of situations. That is why I believe regulation itself is not necessarily going to lead to improved well-being in animals. I think education is the most important factor. The public requires education to raise their level of what they require of organizations that hold and care for animals, but education is also required for those individuals who care for animals. We need excellent education programs for staff so they do not habituate themselves to bad conditions. They must be constantly on guard and watching for ways in which to improve the lot of animals under their care.

Lindburg: I commend Lukas on his use of the word "happiness." It may not be scientific, but it is one to which we can all relate and should be the standard for which we strive.

I would like to extend his presentation to one more dimension. An animal is not constant, it changes in relation to its experiences. Its happiness, therefore, is dependent on how its circumstances relate to its experience. For example, in the captive world the wild animal's environment is highly conditioned by humans. We deliver food at a certain time every day. Animals quickly learn when the food truck will arrive. This is an anticipatory and tense time for them. If we are going to impose artificial conditions on the animals we must keep them consistent if we want to treat these creatures in a humane way.

The second aspect is that we often say the animal born in captivity has different expectations, even though it comes to that experience with certain species-typical potential for behavior. What it has learned in captivity from birth somehow ameliorates some of the more stringent conditions of captivity. This is true, but also potentially dangerous. For example when cheetahs three or four generations removed from the wild are put in a small space they will begin to pace. I think it is their search for the freedom of movement they are denied. We need to take a hard look at how being born in this environment does and does not affect the well-being of the animal.

Kaufmann: We speak of changing and modifying standards and policies, and that is a big part of what must be done. There is another aspect that goes into the educational role; standing up for what you believe and not being afraid to say it. To have the courage to say that

we do not have the laws, that we cannot get a grip on the industry or the field. However, while there may be some wishy-washy areas there are also some definite rights and wrongs. It is wrong to keep a chimp in a cage, make him smoke a cigar and wear a suit. None of us like it. We need to have the courage to use the word "happiness," even though someone might press us on our meaning of the term. I would like to see more writing on this subject in the popular press, not just within the community.

Clutton-Brock: I was brought up with the notion that anthropomorphism was the worst sin you could commit, when animals were considered as something that could be harvested. The most marvelous change I have seen in my career is getting away from this attitude and being allowed and encouraged to view animals as individuals. I fear, however, that this is not happening to domestic animals. The worst aspect for animals in domesticity is that thenpeople who keep them on a large scale are habituated to bad standards. They do not see them as individuals, but as units to be harvested. I hope in years to come there will be a change. I think the zoo community is leading the way, and hope it will be extended to domestic animals. The veterinary community should lead the way but there needs to be a change in thought with how to deal with domestic animals from the veterinary community as well.

Cohn: I would like to infuse a little political reality into the discussion. Washington is a very budget-conscious right at the moment. There is not an agency in government that could not use more money, so the chances of our being funded for the things we are looking for are slim. Therefore we have to take the long view. It is not going to happen overnight.

FINAL COMMENTS

Andrew Rowan, Director
Center for Animals and Public Policy
Tufts Veterinary School

I have long been interested in the fact that there are groups that appear to be antagonistic to one another, giving the appearance that they are opposing one another on a variety of animal issues, for example the biomedical community versus the animal rights community. My experience in both the animal protection movement as well as with a number of humane organizations is that there exists more agreement than disagreement between such groups. People tend to exaggerate the areas of disagreement and ignore the areas of agreement. The classic problem, specifically in groups that tend to be closely allied with one another, is that both believe they are driven by certain moral imperatives. It is these imperatives wherein the difference is believed to lie.

The White Oak conference was developed in part to talk around those moral imperatives. At the beginning, I thought there would be certain issues that would highlight the differences between zoo and animal protection participants. It was only after discussion and debate that those issues turned out to be not nearly as important as I first believed. Through the process of discussion, we identified situations where groups argued about issues that are thought to be important but are actually not, and not dealing with those that deserve attention. This enables groups to work together and make real progress.

Rowan has worked on this issue in the area of animal testing. He initiated the development of a program creating dialogue between animal protection organizations and industrial companies. As a result of that program a seed was established within the National Institute of Environmental Health Sciences (?) that Rowan hopes will grow into quite a substantial power, addressing many of the of the public's concerns about the use of animals in testing. More importantly, the industrial representatives and the animal protection representatives learned to see one another as people that can be worked with to solve common problems. There are still differences, but these groups are now able to work together as opposed to arguing. In that same sense

the conference at White Oak has been very successful over the last several days.

There are also some issues of style that get in the way of substance. The zoo community tends to be focused on scientific arguments while the animal protection community focuses on moral arguments. There are differences in style in those types of discussion that tend to get in the way of developing trust. There are political elements as well that create barriers. For example, both areas of interest have their own political constituencies that they have to speak and listen to which tend to inhibit true communication.

The topics chosen for this conference were wildness as captivity, the issue of well-being and individuals versus populations. The paper presented by Lukas dealing with conservation and in situ, zoos, etc. tried to bring all of these issues together. Rowan asserted that there were some interesting and useful ideas that came out of this workshop for him, personally. One he feels all can use with a fair amount of utility is the idea of biological versus cultural well-being. We must pay attention to both these issues, but not necessarily in the same way. There were also some questions of semantics, having important bearing on the discussion of captivity versus confinement.

EPILOGUE

Howard Gilman
The Gilman Foundation

I would like to see our Foundation be an example and demonstrate that different groups can get together and things can be accomplished with private and corporate backing. There is not necessarily an enormous difference between financial interests and animal interests. If people can be exposed to what is happening here at White Oak, and leave with the hopeful feeling that things really can and do happen, the experience may affect their thinking in the future. They may begin to believe that we can be effective and set standards. It shows that it really does work if you pay attention and are willing to give an emotional and financial commitment. I want you all take a hopeful note from this conference and feel it is worth following up, that we can do more than just write reports. White Oak hopes to expose people to ideas, for people learn through exposure. Thank you again for being here.

SURVEY OF ATTITUDES OF CONFERENCE ATTENDEES TO WILDLIFE CONSERVATION AND ZOO ISSUES

Towards the end of the second day of the workshop, the moderator suggested that the participants agreed with each other far more than disagreed. Nearly all those present disagreed with this conclusion! As a result, the moderator asked the group to complete a questionnaire which would address significant zoo and conservation issues to determine just how much disagreement actually existed. The survey was anonymous but everybody identified whether they belonged to the zoo or animal protection community or had some other institutional affiliation (mainly academic).

The survey was developed by Dr. Andrew Rowan with the assistance of Ms. Jennifer Lewis of the MSPCA and Dr. John Robinson of the International Wildlife Conservation Center and is reproduced below.

In general, there was considerable agreement among the representatives of the zoo/conservation and animal protection organizations. Animal protection representatives were somewhat more negative on the question of the breeding of infants but the only issue on which zoo and animal protection participants were in total opposition was the generation of funds from controlled hunting to support conservation in an African conservation area. In the question on suburban deer, several respondents selected more than one option, explaining that one might have to take more drastic action in the short-term but that a non-lethal long-term management plan should be developed.

This is not a survey of a random sample and it cannot be generalized to wider populations. Nevertheless, all the participants are very knowledgeable and are actively involved in the debate about how best to conserve and protect wild animals. Therefore, the survey indicates that supposed differences in attitudes between zoo and animal protection professionals may be more imagined than real and that both groups should be much more prepared to work together to help the world's threatened and endangered wildlife.

WORKSHOP SURVEY (Answers are given in the boxes)

Please circle/check the answer or scale point that most closely represents your views.

1. Please identify your affiliation/inclination

Zoo/Conservation Program Animal Protection Other

	Zoo/Consrvn	Animal Protn	Other	All
	10	7	6	23

2. Please indicate how strongly you approve/disapprove of:-

a) Producing animal infants to attract visitors

Strongly approve Neutral Strongly disapprove
 1 2 3 4 5 6 7 8 9 10

b) Producing animals for endangered species' plans

c) Producing animals to maintain genetically-balanced captive populations of non-endangered species

d) Producing by accident

	Zoo/Consrvn	Animal Protn	Other	All
A	9.0	9.5	6.5	8.5
B	1.6	3.5	2.0	2.2
C	2.8	5.0	4.5	4.0
D	9.0	10.0	7.5	9.0

3. A donor has just offered \$4 million dollars to the Orang SSP and has stated that the money may either be used for maintenance of the 88 hybrid orangs for their life-time or to establish an in situ captive breeding and park preservation program in Borneo (Indonesia). If you do not use the funds to maintain the 88 hybrid orangs, the SSP has decided that they would be euthanized (it would be truly humane). Please choose one of the options.

- a) Maintain the hybrid orangs.
- b) Support the in situ program.

	Zoo/Consrvn	Animal Protn	Other	All
A	5	3	1	9
B	5	3	4	12

4. The 100-200 rhinos in Namibia are currently not under threat from poachers but it is expected that they will come under threat when the Zimbabwe rhino population has been decimated. Which of the following options would you support?

- a) Do nothing.
- b) Capture them and move them to a secure captive breeding site in Namibia. The park/habitat of the rhinos is in no danger of being converted to farmland if they are removed.
- c) Strengthen anti-poaching units even though this is unlikely to be a long-term panacea.
- d) Dehorn all rhinos before the culture of poaching develops.

	Zoo/Consrvn	Animal Protn	Other	All
A	0	0	1	1
B	5	5	2	12
C	5	2	2	9
D	0	0	1	1

5. You are negotiating over the fate of a wildlife area (1000 square kilometers) in Africa. The national authorities are supporting the involvement of the local communities (who currently are actively involved in poaching in the area). After discussing a variety of options, it is decided that the local communities will become the conservators of the area in exchange for money from 1,000 permits to be issued to sport hunters only for common antelope species and for carefully selected elephant to maintain the elephant herd at a level already agreed to be appropriate for the area. How strongly do you approve/disapprove of this plan?

Strongly approve Neutral Strongly disapprove

1 2 3 4 5 6 7 8 9 10

	Zoo/Consrvn	Animal Protn	Other	All
	2.6	9.0	3.5	4.0

6. It has been determined that a relatively isolated deer herd in the midst of suburban sprawl has exceeded the carrying capacity of the area. The undergrowth has been virtually eliminated to the browse line and the winter produces extensive deer die offs every year. Which of the following options would you choose to deal with this scenario?

- a) Open up the area to sport hunters
- b) Send in sharpshooters with specific instructions to re move females, especially any observed to be in poor condition.
- c) Start an immunocontraception program.
- d) Do nothing.

	Zoo/Consrvn	Animal Protn	Other	All
A	1	0	0	1
B	3	2	3	8
C	7	7	7	21
D	2	0	0	2

7. You have produced a population of 100 Siberian tigers in captivity that could now be restored to a reserve that currently only has a few tigers that are already inbred and will most likely die out in the next ten years if you do nothing. Fortunately, the poaching that caused this problem has been stopped and strong leadership in the region has been re-established so that restoring the population with some of the captive-bred tigers will most likely be successful. Unfortunately, mortality among the captive-bred tigers will be high (80% will die due to the rigors of the reintroduction process). Would you approve or disapprove of restoring your 100 captive-bred Siberian tigers to the area?

Stongly approve Neutral Strongly disapprove
 1 2 3 4 5 6 7 8 9 10

	Zoo/Consrvn	Animal Protn	Other	All
	3.0	2.6	2.7	3.0

8. You are running a zoo in which you have had great success in breeding endangered Orinoco crocodiles and Emperor tamarins. However your resources are being cut back and you have to euthanize either a group of crocodiles or a group of tamarins. Which group would you euthanize?

- a) The crocodiles
- b) The tamarins
- c) Refused to choose

	Zoo/Consrvn	Animal Protn	Other	All
A	2	3	4	9
B	5	3	1	9
C	3	1	1	5

9. You have a limited budget for a new education/marketing program. You could set up a very successful model dinosaur exhibit that has been shown to draw visitors and to cover the capital costs within five years. However, you also have been approached by a school teacher who won one of the \$25,000 "teacher awards" for excellence who now wants to start an education program at your zoo. Which project do you choose?

- a) The dinosaurs
- b) The teacher

	Zoo/Consrvn	Animal Protn	Other	All
A	0	0	0	0
B	9	6	6	21

WILDLIFE CONSERVATION, ZOOS, AND ANIMAL PROTECTION: A STRATEGIC ANALYSIS

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INTRODUCTION

The purpose of this report is to analyze the effectiveness of the United States' animal protection organizations and zoo community in achieving their objectives with regard to wildlife conservation, and to suggest strategies for future action. Specifically, the report is to look at attitudes and campaigns of animal protection organizations towards zoos, both historical and contemporary; effectiveness of the zoo community, including the American Zoos and Aquarium Association (AZA), on specific conservation issues; recent changes in AZA policies and practices and their effect on the mission and goals of zoos; effectiveness of zoo/animal protection policies and practices in furthering their wildlife conservation objectives; and recommended changes in strategy, if necessary, for the animal protection and zoo communities, in their relationship to each other and their pursuit of conservation objectives. The report is not intended to be an exhaustive and detailed catalogue of zoo and animal protection efforts in wildlife conservation; it is rather a summary analysis, based on existing documents. Original research was conducted on historical and current attitudes and actions of the animal protection community toward zoos.

ANIMAL PROTECTION ATTITUDES AND CAMPAIGNS TOWARDS ZOOS

A. Historical: 1868 - 1970

Historically, animal protection organizations such as the Massachusetts Society for the Prevention of Cruelty to Animals (MSPCA), the American Humane Association (AHA), and the American Society for the Prevention of Cruelty to Animals (ASPCA) criticized zoos but did not mount campaigns to reform them. ASPCA, MSPCA, and AHA were three of the earliest humane organizations, founded in 1866, 1868, and 1877 respectively. They were leaders in the nascent humane movement and

their attitudes and policies set the movement's agenda. Both the MSPCA and AHA have publications going back to their founding, which were surveyed for this report.

The MSPCA, almost from its inception, strongly criticized zoos. The Society's concerns were two: humane care of zoo animals and the lack of freedom and abilities to express natural behavior (when compared to the wild). These concerns seem strikingly modern and are mirrored in the concerns of animal protection organizations today. However, while the MSPCA mounted major and successful campaigns on issues such as legislation to prohibit cruelty to domestic animals, education of children in humane values, and opposition to performing animal acts, they took no major action on zoos that I could find between 1868 and 1970. From the 1970s to the present, the MSPCA has not mounted zoo campaigns. It has, however, been involved in issues of humane care and administrative restructuring at several Massachusetts zoos, particularly Franklin Park and Stone Zoos in metropolitan Boston.

AHA focused its attention largely on prevention of suffering to domestic animals and children. It worked on some wildlife issues, such as fur-bearer trapping, but showed little evidence of any real interest in zoos.

The ASPCA's founder, Henry Bergh, was very concerned about the conditions in which animals were kept at New York's Central Park Zoo in the late nineteenth century. He complained frequently to the park commissioners about inadequate food, lack of sanitation, poor ventilation, and other problems. He even enlisted the Tribune and the New York Times in his struggle to improve conditions, to no avail (Steele, 1942).

Ernest Bell, an early leader of the humane movement in England, wrote a number of articles on zoos between 1900 and 1920 that expressed much the same concern shown by the MSPCA for the humane care of zoo animals, the abysmal conditions in which they were kept, and their lack of freedom. In addition, he was horrified by the high death rates in zoo animals and by their capture and transport from the wild, an action he considered unconscionably cruel (Bell, 1927).

Why, if the leaders of the humane movement were appalled by zoos, did they neither try to reform nor abolish them between the mid-nineteenth and mid-twentieth centuries? My feeling is that they realized how popular zoos were with the public, both as entertainment and as symbols of

civic pride. The humane leaders were far ahead of their time in feeling empathy and love for wild animals, and in their (admittedly intuitive rather than scientific) understanding of the benefits conferred on wild animals by autonomy. Many people, even in industrializing countries, either lived in or were not far removed from rural life, in which wild animals were regarded as dangerous, fearsome, and pestiferous. The keeping of pets, an urban phenomenon that teaches owners to love animals and regard them as individuals capable of suffering and happiness, was not sufficiently widespread to encourage a shift in attitudes which could then transfer to wildlife. Films and television programs that showed wild animals in a positive light in their natural habitats were far in the future. The public simply lacked sufficient understanding of or feelings of affiliation with wild animals for anti-zoo campaigns to succeed, even if massive education efforts had been mounted. In addition, people who did feel some affiliation with wildlife may have been less susceptible to action because so many of these animals remained in the wild.

Is there a lesson for today in this history? Though attitudes of love and empathy for wild creatures have increased greatly for a number of reasons, and the visiting public is more sophisticated in its understanding of what constitutes humane care, the current popularity of zoos (more than 100 million visits each year) (IUDZG/IUCN, 1993) and the belief of many that keeping wildlife in captivity is not cruel if the animals are treated well (Kellert and Dunlap, 1989) militates against the success of public campaigns to abolish all zoos. Please see **Recommendations** for further discussion of this point.

B. Contemporary: 1970 - Present

In 1971, the Humane Society of the United States hired a zoo advocate, ushering in a era of action on zoos. The HSUS zoo advocacy department eventually encompassed three full-time staff, who worked with zoos and municipal authorities to improve conditions, directed media attention to zoo problems and problem zoos, advocated with zoos, AZA, and the public for better care, naturalistic exhibits, responsible disposition of surplus animals, and other improvements. Occasional assistance was provided to zoos in finding homes for surplus animals or animals retired for other reasons. Some exposes were mounted, notably the "Ten Substandard Zoos" article in Parade Magazine in the middle 1980's. The article brought zoo animal care to the attention of the public, and along with pressure being applied by the zoo community, helped bring about ma-

for improvements in the Atlanta and New Orleans Zoos (Pressman, 1995). Though some changes occurred in the mid-1980s, the HSUS still has a zoo advocate on staff who continues to work to improve zoos.

Although a shift occurred in the 1970's from complaining about zoos to hiring personnel to investigate zoos and advocate for zoo animals, few other animal protection organizations followed suit. Other organizations who have worked on zoo issues in this period have included People for the Ethical Treatment of Animals (PETA), the Fund for Animals, the Animal Welfare Institute/Society for Animal Protective Legislation (AWI/SAPL), the MSPCA, the World Society for the Protection of Animals (WSPA), the Born Free Foundation (BFF) and some local and regional groups. With the exception of WSPA/BFF's Zoo Check in Canada and the United Kingdom, and a new effort now under development at WSPA, these organizations have tended to focus on a few specific institutions and issues, rather than setting up an ongoing program to look at a variety of zoo issues. This is true of the HSUS' current program as well, which largely focuses on the issue of surplus animal disposition. Attention has often been directed by animal groups to the death or mistreatment of specific animals at particular zoos, such as the beating of an elephant at the San Diego Zoo in 1988, the 1993 death of an elephant at the Los Angeles Zoo, the euthanasia of several tigers at the Detroit Zoo in the early 1980s, and the exhibition of imported Chinese pandas at the Columbus Zoo during the AZA moratorium on such exhibits.

In 1994, WSPA and BFF published *The Zoo Inquiry*, an investigation into the welfare of zoo animals, and the conservation and education programs by which zoos justify their existence. The report covers zoos all over the world, but it focuses primarily on European zoos. *The Zoo Inquiry* takes zoos to task for failure to provide adequately for animal welfare, resulting in both physical and psychological suffering; lack of interest in field conservation, especially in the empowering of local people to appreciate and manage their wildlife; too great a reliance on captive breeding and reintroduction in saving species; lack of justification for keeping many species in captivity; and failures of education programs. While the report makes a number of interesting points, it appears to start from the premise that zoos have adopted conservation and education rhetoric to "sanitise" their existence, and to quote selectively from a relatively small number of sources to support this view. The authors do not appear to distinguish between progressive and regressive (good and bad) zoos (or perhaps they do not feel such a distinction exists), and the tone of the

report is generally hostile. They correctly point out that, given space and financial limitations, captive breeding and reintroduction are of limited usefulness, and they address issues that the zoo profession seems reluctant to discuss outside the profession, such as abnormal behavior, psychological suffering, disposition of surplus animals to inhumane fates, the low rate of success in reintroductions, unnecessary breeding, and appropriate social groupings. But they give the zoo profession no credit for the current changes taking place. The report would have been more effective had it been less hostile and apparently biased.

In addition to their work directly related to zoos, animal protection organizations have also taken other actions to foster protecting species in the wild, including major roles in the periodic reauthorizations of the Endangered Species Act and the Marine Mammal Protection Act and in the passage of the Wild Bird Conservation Act; participation in the biennial meetings of the parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES); work at the international, national and state and local level to abolish the use of the leghold and other injurious traps; campaigns against fur garments; attempts to ban hunting and trapping on the National Wildlife Refuge System; lawsuits on the protection of wildlife in the refuge system and the National Park System; successful state referenda variously banning spring bear hunting, hunting of bears and mountain lions with dogs (including all lion hunting in California), and banning trapping on public lands; rescue and relocation of wildlife endangered dam construction and other manmade and natural disasters; a few habitat protection and species reintroduction efforts; and contraception of free-roaming deer populations.

AZA/ZOO EFFECTIVENESS ON CONSERVATION ISSUES

This section will focus on the effectiveness of zoos and the AZA on the following issues: captive breeding and reintroduction of endangered species, field conservation projects, and conservation education. These are the programs that zoos use to justify their existence.

A. Captive Breeding and Reintroduction

This issue is composed of two parts: 1) captive breeding for reintroduction programs and reintroduction success; and 2) development of captive-breeding techniques.

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1. **Breeding for Reintroduction:** Thousands of the world's species are endangered and E.O. Wilson (1992) conservatively estimates that 27,000 species (mainly invertebrate) are disappearing each year in rain forests around the world. In 1991, about 350 endangered species were being bred in zoos worldwide, and about 450 maintained (International Zoo Yearbook, 1992). Sixteen have been successfully reintroduced to the wild. (Success in this case means establishing self-sustaining populations, or having a high potential to do so.) Indeed, for institutions that justify their existence partly by endangered species preservation, a surprisingly small part of zoo collections seems to be made up of these animals.

At their best, reintroductions such as the Golden Lion Tamarin Program both save a species and help preserve its vanishing habitat, in no small part by raising concern in the habitat country for its preservation. (Though one critic within the zoo profession believes the increase in protected habitat could have been achieved without captive breeding and reintroduction, because it resulted from building support within the habitat country for its preservation (REFERENCE).) Limitations on space and other resources, however, mean that only some currently endangered species can be preserved by *ex-situ* programs. The *World Zoo Conservation Strategy* estimates the number of endangered species that can be maintained in zoos at 1000-2000, assuming 500,000 places in larger zoos around the world and breeding populations of 250-500 animals. This estimate assumes that all currently and potentially available spaces in larger zoos are used (IUDZG/CBSG, 1993). Maintaining smaller populations of some species 1) as "security reserves" for animals endangered but not extinct in the wild, and 2) for shorter time periods (5-20 years) until most individuals can return to the wild, as well as mobilizing smaller zoos and even non-zoo facilities to provide more space, may enlarge somewhat the number of species that could be captive-bred. However, it is clear that the "Noah's Ark" paradigm of saving most or all endangered species in captivity for eventual reintroduction is untenable. (See **AZA: Changes in Policies and Practices**, below, for more discussion.)

Even if the maximum number of species could be maintained,

other problems remain. No guarantee exists that native habitats will be available to which to return captive-bred animals. Indeed, their removal to captive breeding programs, especially if all remaining members of a population are removed, may tend to accelerate habitat loss by lowering immediate incentives for its preservation. Even if habitat remains, other factors which originally resulted in their declines may still be present, such as capture for the pet trade, killing for food or wildlife products, or killing to eliminate competition with humans for resources. Another problem is the effect of captivity on the species over a number of generations. Effects may result from long-term captivity which decrease the species' ability to survive in the wild, such as loss of the abilities to mate, raise young, find food, avoid humans; younger age of first breeding and lengthened seasons for bearing of offspring (which may not correspond to favorable weather or food conditions in the native habitat). These effects are most pronounced in animals where learning plays a large part in acquiring survival skills, such as mammals.

The vast majority of endangered species being kept at zoos are mammals and birds. Zoos have been criticized for concentrating their efforts on charismatic megavertebrates and neglecting the less glamorous, less warm-and-fuzzy species such as reptiles, amphibians, fish, and invertebrates who are also key components of ecosystems. To their credit, zoo professionals have begun to pay more attention to these species, as evidenced by, for instance, the establishment of the Lake Victoria Cichlid SSP on endangered fishes. (See **AZA: Changes in Policies and Practices** below for a related discussion of flagship taxa and keystone species.)

2. Captive Breeding Techniques: On the brighter side, it is helpful to realize how far zoos have come in the last 25 years in the science of captive breeding and maintenance of many species, and in techniques and knowledge vital to reintroduction. Zoo- and aquarium-based research have been responsible for a number of advances. Technological progress in animal reproduction, such as gamete cryopreservation, *in vitro* fertilization, embryo transfer and artificial insemination, have assisted in improving breeding success. Advances in telemetry for moni-

toring species movements; methods of identifying individual animals; major advances in wildlife medicine, including the initiation of an international field veterinary program by the Wildlife Conservation Society; research into the ecology, reproductive biology, genetics, behavior, and nutrition of a number of species; professional training and technology transfer in habitat countries; and the establishment of Species Survival Plans resulting in progress in the genetic and demographic management of small populations have all contributed to increased success in captive breeding, maintenance, and reintroduction. However uncomfortable animal protectionists may be with the degree of manipulation and intervention necessary to some of these advances, without them much progress would not have occurred.

Endangered species breeding, maintenance, and reintroduction have only been zoo priorities since about 1970. Species Survival Plans were initiated in 1981. Considering how relatively short a time has elapsed since the initiation of these programs, zoos have done a creditable job, particularly in captive breeding and maintenance, and they deserve recognition by animal protectionists.

B. Field Conservation

A few zoos and zoo-based groups have also instituted in-situ programs on specific species or habitats. Some of these programs include

- *the Fort Wayne Children's Zoo education, exhibition and fundraising program to conserve endangered primates and their habitats in Indonesia's Mentawai Islands;
- *the Golden Lion Tamarin Conservation program, a project of the Brazilian government and a consortium of zoos, combining captive breeding and reintroduction with habitat preservation and raising awareness in the local area;
- *the AZA Sumatran Tiger SSP's Indonesia program, involving captive breeding, habitat mapping, analysis of resource use in tiger habitats, population modelling, and training of Indonesian wildlife personnel;
- *the White Oak Conservation Center's okapi project in Zaire;
- *the Chicago Zoological Society's support for the Brookfield Conservation Park in Australia and financial support of field

projects; and
*the Minnesota Zoological Garden's support for Java's Ujung
Kulon National Park, home of the critically endangered
Javan rhino.

These projects and a variety of programs undertaken by the Wildlife Conservation Society, the leader in zoo-related field conservation, give encouraging evidence that some zoos are taking in-situ conservation seriously. Some projects have been successful and some have not; a meaningful assessment of the general success of these programs is probably premature, given their newness at many institutions.

C. Conservation Education

Education of the visiting public about the necessity of preserving species and habitats is the third major reason that zoos give for their existence. Zoos attempt to teach conservation both through exhibits and information displays and through formal education programs. All accredited zoos across the country have formal education programs, and millions of people, especially primary school children, pass through them each year. Millions more make casual visits to zoos each year to see the exhibits. But how successful has zoo education been?

About 119,000,000 people visit accredited zoos and aquaria yearly in North America (AZA, 1994). Worldwide, an estimated 619,000,000 visits are made to zoos each year (IUDZG/CBSG, 1993). In 1991, 14,000,000 people went through formal zoo education programs, including 10,000,000 children and 35,000 teachers (Conway, 1995). The zoo profession makes sweeping statements about the educational value of both viewing exhibits and participating in formal education programs. "Zoos make a huge contribution to the success of education campaigns undertaken by governmental and nature conservation organizations (such as the World-Wide Fund for Nature) simply by providing the opportunity for contact with examples that these organizations are concerned with....[If the right messages are given to the visitor] he or she will more rapidly be prepared to make a personal contribution to nature conservation...in attitude, personal commitment, financial support, and so on....If the entire zoo staff is indeed education-minded and time is made available, then even small zoos which cannot afford to set up an education department can still be excellent educational institutions" (IUDZG/CBSG, 1993). Public education is one of the most important responsibilities of modern

zoological parks" (Hutchins and Conway, in press). "The most profound and moving lessons zoo education has to offer are simply well-cared-for, well-exhibited, living animals. They live with us, daily creating news and arousing interest, acting as ambassadors for their kind. They do not permit us to ignore the fact that their kind exists. In the United States, well over 100 million people took advantage of that lesson in 1991..." (Conway, 1995). "Zoos and aquariums host from 300 million to 400 million visitors each year, providing the benefits of meaningful education and recreation" (Maple, 1995).

These statements make a very important assumption: show a visitor a well-designed exhibit or teach a visitor a conservation lesson, and s/he will receive the right message, form the desired values, and take actions to support conservation. Data to support this assumption are exceedingly scarce.

In discussing this subject, the distinction between formal and informal zoo education deserves reiteration. Formal education means the classes, workshops, guided tours, and other structured activities given by zoo staff to schoolchildren, teachers, and other visitors, both at the zoo and in other locations. While some evaluation of formal education programs has been done at individual zoos, review of these studies was beyond the scope of this paper. However, at least some of these education programs have been successful in their objectives of increasing knowledge and understanding (Schildkraut, 1995). Informal education is the learning that, it is hoped, takes place as the casual visitor views and interacts with the exhibits and reads any signs or other informational material provided.

Using the 100 million yearly attendance figure and Conway's figures on education programs cited above, formal education accounts for roughly 15% of yearly zoo visits. The vast majority of zoo visitors, if they learn, will be learning informally.

Kellert and Dunlap (1989) reviewed the sparse literature on informal zoo learning and performed an empirical study of it at three zoos. Their findings were disturbing, suggesting that the impact of informal education may be quite limited.

In the literature review, Kellert and Dunlap state, "Confident conclusions...are difficult to offer," due to the small number of studies

and consequent lack of data. However, certain tendencies can be discerned across studies.

1. Being able to see and interact with live animals and “enter partially into” their world is one of the most important reasons visitors come to zoos (Kellert and Dunlap, 1989).
2. Exhibits that encourage interaction between different visitors and between visitors and animals seem to increase visitors’ interest. One study concluded, “active participation heightens the acquisition and retention of information” (Shettel, 1973).
3. Opportunities for this interaction are rare. Many living animal and informational exhibits require the visitor only to look and read, though zoos are mounting a growing number of interactive learning exhibits (not involving live animals).
4. Naturalistic exhibits are a double-edged sword. While visitors like to see that animals are placed in these settings, this desire arises more from feelings of emotional attachment to the animals and concern for their welfare than from a desire to learn about their habitat relations. Naturalistic exhibits can hinder visitors from fulfilling their wish to see many species and see them closely.
5. Despite the potential effects of seeing living animals, the primary motivation of most visitors is recreation, having a pleasant social experience in a park-like setting, especially for families.
6. Learning is not a primary motivation for visiting zoos. Learning is regarded as work, visiting the zoo as play. Information on wildlife conservation “is often regarded as gloomy and depressing,” and the majority of visitors are not interested in learning more about wildlife conservation or even the animals themselves (Kellert and Dunlap, 1989). One researcher concluded that visitors in her study “did not gain a better understanding of wildlife at the larger facilities despite the higher degree of naturalness, substantial educational efforts, and longer zoo visits” (Swensen, 1980). She studied four kinds of zoos, from the roadside menagerie to the large modern zoo.
7. Signs as an educational tool are not effective; the majority of visitors do not read signs, and those who do typically read for one-half minute

or less. The sign is still the primary informal education tool at most zoos.

The empirical study performed by Kellert and Dunlap took place at three zoos: Philadelphia, Sedgwick County in Kansas, and the Sonoran Desert Museum outside Tucson. These zoos were picked to represent a range of types: an urban zoo with a mix of naturalistic and traditional exhibits, a smaller zoo in a rural area with mostly traditional exhibits, and a completely naturalistic "living museum," concentrating on species indigenous to its locale. They looked at motivations for visiting the zoos, perceived benefits, attitudes towards animals, and the amount of learning that took place. Learning was assessed from interviews of visitors on entering and leaving the zoo; no followup was done to evaluate possible longer-term learning.

Their findings tended to confirm many of the findings of the literature review. Though substantial fractions of the visitors said they came to learn about animals (34-62%) and teach children about animals (21-43%), the two most important reasons at all three zoos were recreational and aesthetic: family enjoyment (69-73%) and seeing beautiful animals (56-72%). Learning about wildlife conservation was near or at the bottom of the list for Philadelphia and Sedgwick, and fifth out of nine reasons for Sonoran (18-25%; 47% for Sonoran).

Perceived benefits fell into three categories, with 62-98% of respondents agreeing that aesthetic, emotional (affection for animals), and entertainment benefits were the ones they got from the zoo. Three quarters of the visitors at all three facilities saw nothing wrong with keeping animals in cages as long as they were treated properly.

Attitudes of visitors towards animals were measured both before and after visiting the zoos. Feelings of affection and interest for animals (humanistic) as individuals increased slightly at Philadelphia and Sonoran, and declined slightly at Sedgwick. Feeling of interest and affection for wildlife and the outdoors (naturalistic) declined slightly at Philadelphia and Sedgwick, and slightly increased at Sonoran. Concern for the proper treatment of animals (moralistic) declined at Philadelphia and Sonoran, and increased at Sedgwick. Concern for the environment as a system and relationships between wildlife and natural habitats and interest in the biological functioning of animals (ecoscientistic) declined substantially at all three zoos. Knowledge scales also declined at all three zoos.

Kellert and Dunlap conclude that the knowledge scale result “suggests the zoo visit exerted only a minimal influence on visitor factual knowledge of animals,” though frequent, as opposed to one-time visitors did show some increase in knowledge. On attitudes, the general results above mask increases of some subgroups, such as repeat visitors and those who went to the zoo with the purpose of learning about wildlife, who showed higher naturalistic and ecoscientistic scores after their zoo visits.

Judging by the research above and by the 1994 national elections, in which Americans made it abundantly clear that while they may support conservation, they do not vote on that basis, I conclude that zoo education has not produced legions of citizen-conservationists. Although more research is clearly needed, it is not too soon for zoos to take a hard look at their formal and informal education programs. The analysis above suggests several points that might be confirmed or refuted by such evaluation.

1. Informal education, at least as presently carried out, is not effective, except possibly for people who arrive already motivated to learn about wildlife. The few seconds spent reading signs and the few minutes or seconds spent in front of individual exhibits do not teach people facts about wildlife, and in no way approach the development of conservation values.
2. Zoos are largely regarded as recreational facilities by the public, and learning, however attractively presented, may not be compatible with this view.
3. Formal education programs may be more effective vehicles than informal ones. If that is true, then zoos would be more effective spending their money on formal programs and producing several million conservationists a year, rather than trying unsuccessfully to make 100 million visitors conservationists against their inclinations.
4. Given the high value zoo visitors place on aesthetics, concentrating exhibits on beautiful animals may be the best strategy if informal education is to have an impact. One needs to start where people are.
5. Inexperienced wildlife watchers (probably the majority of zoo visitors) need to see animals close up, for short periods of time, and being active, in order to increase their interest. Interaction — seeing

animals respond to them or being able to look into their eyes — creates a sense of contact and communication. Whether this can be achieved safely and without unduly stressing the animals is an open question. Seeing animals in naturalistic exhibits and showing natural behaviors may help visitors understand them. More sophisticated wildlife watchers can be satisfied with animals farther away, and are able to concentrate for longer periods (though they are thrilled with closer contact, as many participants in the White Oak Conference would testify).

6. Effective education needs to help visitors understand that humans must make changes in their lifestyles if wildlife is to survive. Information on recycling, reduced water consumption, energy efficiency, organic lawn and garden care, not buying wildlife products or pets, looking up the conservation voting records of their legislators, and other subjects — addressed to changes visitors can adopt in their own lives — may help to allay the feeling that information on wildlife conservation is “gloomy and depressing” by giving visitors positive actions to take.
7. Traditional cage-and-iron-bar exhibits not only fail to give the visitor any insight, however brief, into the lives of animals, they send a message that extreme domination and control of wildlife is acceptable, and that species can survive in these environments.

AZA: CHANGES IN POLICIES AND PRACTICES

For the last several years, the AZA has been engaging in an honest and extensive self-evaluation, in terms of the mission and goals of zoos. Two major conferences, in Atlanta in 1992 and Florida in 1994, have brought together zoo directors and staff, AZA staff, academic and zoo-based scientists, animal protection organizations, philosophers, and public policy analysts to discuss the future of zoos, the appropriate recipients of protection (genes, populations, species, ecosystems), the aims and ethics of captive breeding programs, the proper role of zoos and wildlife center in endangered species recovery projects, zoo education programs, animal welfare in captivity, and disposition of surplus animals.

The AZA and some of the leading zoos have begun to realize that the “Noah’s Ark” approach of saving species in captivity for eventual reintroduction can have only limited effect. Some of the factors contributing

to this change are the limited capacity of zoos to maintain large numbers of species, a lack of habitat for reintroduction, the cost and technical difficulties of reintroduction, and the necessity of support and understanding from residents of habitat countries. Field conservation — preserving habitats and species in the wild — appears to extend the best hope of saving at least some species and ecosystems from a rising tide of humans. And field conservation can utilize the existing knowledge, scientific staffs, research, veterinary and technological expertise, and fund-raising skill of zoos.

AZA has undertaken a major revision of the overall mission of accredited zoos and is now advocating heavy investment by zoos in field conservation projects and strategic redesign and management of *ex-situ* zoo collections and programs, including fund-raising programs, to support *in-situ* efforts (Hutchins, et al., 1995). The baby is not being thrown out with the bathwater, however: AZA still supports the importance of captive breeding for those species extinct in nature or with such small or fragmented populations that they will not survive with human assistance. Another strategy being advocated by AZA is the adoption of flagship taxa, “those that have the ability to excite public attention and help preserve habitat and other taxa as well as genetic variation” (Hutchins, et al., 1995). While this may seem to be a thinly disguised justification of the charismatic megavertebate collection, I believe it is not. Limited space, money, and personnel make the Noah’s Ark concept untenable. Concentrating on flagship species, such as the golden lion tamarin, may result in preservation of the systems they inhabit, to the benefit of many other species. As Hutchins, et al., state, “there may be no need to have more than a few hundred carefully selected flagship SSPs in each region....” In addition, such a program might reduce the numbers of species and individuals that would need to be kept in captivity.

If the concept of flagship species could be combined with that of “keystone” species (Wilson, 1992), a comprehensive and manageable approach to saving the natural world might result. Keystone species are the “biggest players” in ecosystems, whose “removal...causes a substantial part of the community to change drastically....Put the keystone species back in and the community typically, but not invariably, returns to something resembling its original state. It has become clear that an elite group of species exercises an influence on biological diversity out of all proportion to its numbers” (Wilson, 1992). Unfortunately, we do not yet have the knowledge necessary to identify many keystone species. Those that

have been identified, whose existence is endangered in the wild, should become flagship species.

The AZA has adopted guidelines for field conservation programs for AZA members, which, among other things, discourage the capture of animals from the wild without adequate justification. AZA has also set up a variety of inter-zoo coordination groups to assist in captive breeding and to foster field conservation projects.

Species Survival Plans (SSPs) were established in 1981 to deal with maintaining small populations over long time periods. Under a recently-developed mission statement, their focus is shifting to include more in-situ work. Several SSPs now integrate captive breeding, reintroduction, research, professional training/technology transfer/education in their habitat countries, habitat preservation, and fundraising. There are 69 SSPs covering 116 species.

The AZA Field Conservation Committee, started in 1993, promotes in-situ projects at AZA member institutions through education, providing guidance and assistance, and monitoring successful projects. The FCC has also arranged major sessions on field conservation at recent AZA annual conferences and is producing an AZA Field Conservation Resource Guide.

Fauna Interest Groups (FIGS) coordinate in-situ projects of AZA members in specific regions of the world. Seven groups currently exist: Brazil, Madagascar, Meso-America, Paraguay, Southeast Asia, the West Indies, and Zaire. Fauna interest groups concentrate on areas of high biological diversity. Membership consists of North American zoos and aquaria with interest in the region, academic institutions and other non-government organizations, and advisors from the region, including government wildlife agencies.

Taxon Advisory Groups (TAGs) choose new taxa for captive breeding programs, organize field programs, and support SSP field projects in their area of interest. Their main function is regional strategic collection planning, assessing all space available for a taxon and how it should be managed. Forty-one Taxon Advisory Groups currently exist.

The Research Coordinator's Committee, composed of research coordinators from individual zoos, was recently established to share informa-

tion on the administration of research programs, including the design of programs, ethical issues, and other consideration.

Also recently established, Scientific Advisory Groups (SAGs) give discipline-based support to Fauna Interest Groups, Species Survival Plans, and Taxon Advisory Groups on scientific and technical issues. They also facilitate communication and working relationships with outside scientists and scientific societies concerned with issues of interest to zoos. Current Scientific Advisory Groups include Behavior and Husbandry, Contraception, Genome Banking, Reintroduction, Small Population Management, Systematics, and Veterinary Science.

Another potential change, advocated by Michael Robinson, Director of the National Zoo, deserves mention — the biopark concept. (Robinson, in press) Robinson suggests combining aspects of zoos, aquaria, botanic gardens, arboreta, natural history museums, archaeology / anthropology / ethnology museums, art museums, planetaria. The goal of the biopark would be to teach people not only what we know about the adaptations, variety, beauty, and utility of the natural world, and its avoidable destruction, but also how humans arrived at that knowledge and the history of our relationships with nature. Robinson feels that bioparks, which would present an integrated and holistic view of nature (including humans), are essential to the biological education necessary if natural systems are to be saved.

How effective these changes will be in shifting the focus of zoos toward in-situ conservation, and in the long-term conservation of species and habitats remains to be seen. Much credit should go to the AZA for these changes and for publicly acknowledging the limited utility of captive breeding as a sole strategy and for actively advocating within the accredited zoo community for field conservation and restructured ex-situ facilities to support it. These policies are clearly reflective of trends in the “best” U.S. zoos, and presently only about 25% of accredited organizations undertake field conservation activities. But this percentage is respectable, considering the newness of the programs. Further, the indications from such projects as the Golden Lion Tamarin Conservation Program in Brazil, the Wildlife Conservation Society’s programs in a number of countries, and the Sumatran Tiger SSP’s Indonesia program are encouraging. The willingness of some zoos to devote money and staff to field conservation holds promise for both habitat and species preservation.

A number of challenges remain. First, the AZA is a professional association, not a regulatory body. It can suggest changes to its members, and use its influence to encourage their adoption, but it cannot force members to make them. Second, some zoo directors, municipal park authorities, and boards of directors will resist these changes, because 1) their interests are local and they see no justification for using their resources outside their communities (Hutchins and Conway, in press); and because 2) zoos must bring visitors to pay the bills and they may not see incentives for undertaking these expensive new programs. AZA rightly recognizes that though zoos have an "ethical obligation" to contribute to conservation, they must see some benefits as well, such as new funding sources, increased media exposure, and enhanced public relations (Hutchins and Conway, in press). Third, accredited zoos/aquaria (162) are only about 10% of the total number of zoos and other facilities in the U.S. (1600) that exhibit animals. The value to conservation of these roadside zoos, bear parks, safari parks, and just plain bad zoos is nil. They are not members of AZA and the changes in AZA policies will have no effect on them. (See the **Recommendations** section for further discussion of these exhibitors.)

Zoos also face other barriers on their route to becoming wildlife conservation centers. The attachment of the public and even of some zoo staff to individual animals can make certain actions difficult, such as moving animals to other zoos for population management reasons, closing substandard exhibits, and the euthanasia of surplus animals for whom no good homes can be found. Zoos also must keep visitors coming in the doors to pay the bills, which in part drives the kinds of exhibits they develop. In addition, local zoo patrons and politicians, especially in zoos which receive municipal funds, may be opposed to spending money on field conservation or other projects from which they see no immediate local benefit. In some cases, zoo patrons who would fail to recognize a good zoo if it ambled up and bit them on the leg may oppose closing substandard facilities, or fail to support necessary improvements. And the issue of educating the one- or two-time casual visitor is by itself an enormous challenge.

CONSERVATION AND CAPTIVE WELFARE OBJECTIVES: EFFECTIVENESS OF ANIMAL PROTECTIONISTS

This section is divided into two topics: effectiveness of animal protectionists in achieving changes in zoos, and their effectiveness in their con-

servation objectives, both at zoos and elsewhere.

Zoos

With regard to progressive zoos, animal protectionists have had a considerable amount of success. Their messages about improving captive animal welfare, installing naturalistic exhibits, and undertaking field conservation have clearly been heard. Some progress is also being made on the issue of surplus animal disposition, including the growth and improvement of sanctuaries for retired zoo animals. An association of sanctuaries has been formed and has adopted standards based on the AZA's accreditation requirements for zoos. Five sanctuaries have been approved under the program (Pressman, 1995). While progressive members of the zoo profession have also called for these changes (REFERENCE), animal protection strategies are at least partly responsible.

Animal protectionists have had much less success with substandard zoos. While they have succeeded in improving conditions for some specific animals at specific zoos, little has been achieved with standards or laws, either on the state or federal level, to improve or close these facilities. Federal Animal Welfare Act standards and enforcement are not adequate to prevent the suffering of many animals, and state laws are weak or non-existent.

Other Conservation Objectives

With regard to other conservation objectives, animal protectionists have been effective in some areas, less so in others. They have worked successfully in the past for reauthorizations of the Endangered Species Act and the Marine Mammal Protection Act, though they have not always been able to prevent the passage of weakened sections of these laws. They worked successfully to help pass the Wild Bird Conservation Act, which is putting a dent in the destructiveness of the international bird trade. (The AZA has also worked for the passage of these laws.) They have achieved increased protection for some species, and maintained protection for others, under CITES. The HSUS has strongly supported the development and use of immunocontraception as an alternative method of controlling wild deer populations, and the application of other non-lethal methods to the control of wildlife problems. AWI/SAPL led the fight for the Animal Welfare Act. The Fund for Animals has supported several successful state referenda on wildlife issues. The HSUS

has recently set up its own US-wide land trust. Campaigns against furs have resulted in decreases in fur purchases and the closure of a number of retail and fur-buying establishments.

RECOMMENDATIONS FOR THE ANIMAL PROTECTION AND ZOO COMMUNITIES

Introduction

The most striking feature of the Atlanta and White Oak conferences was the degree to which animal protectionists and zoo professionals agree on a number of key issues, especially for groups who have been perceived as widely at variance. These recommendations are based, in part, on that concurrence.

The Atlanta conference produced a high degree of consensus on the following major topics (Norton, et al., in press):

- *the imperative of field conservation and habitat preservation;
- *the necessity of ex-situ breeding, maintenance and reintroduction for species that cannot currently be effectively protected in the wild;
- *devoting more ex-situ space to at-risk species and less to common species;
- *resolution of the surplus animal problem (mentioned by three of the six working groups), including putting all species in well-designed management programs to minimize surpluses, use of surplus animals in education and display, and continued efforts by the AZA to define the nature and extent of the surplus problem;
- *increased focus on zoo education programs, both formal and informal; use of off-site breeding facilities rather than exhibit-based ones;
- *the definition of euthanasia as killing only for the benefit of the individual animal when it is no longer possible to maintain his/her quality of life;
- *need for a frank assessment of speciesism in veterinary care and euthanasia;
- *the need to make attempts to identify consensus areas between zoos and animal activist groups, followed by mutual public endorsement;
- *quality of life as the highest priority for captive animals;

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- *the need for captive management to be knowledge based, including research and constant revision of standards for care as results are reported, and species specific improvements in enclosures, both exhibit and off-exhibit, with the goal of maximizing opportunities for animals to express their natural behaviors;
 - *the need for "higher and more objective standards for captive care, maintenance, and welfare within the AZA," and holding zoos to these standards through the accreditation process;
 - *working with USDA to raise their standards to eliminate inferior, non-AZA facilities (mentioned by three of the six working groups);
 - *formal liaisons between zoos and professional societies, animal protection organizations, government organizations, and others;
 - *stewardship, not ownership, as the appropriate paradigm for our relationships with zoo animals;
 - *increased awareness by the AZA and its member institutions of welfare considerations in zoo-sponsored research;
 - *potential appropriateness of both basic and applied research if it holds promise for nontrivial benefits for non-human animals, species, and/or ecosystems; and
 - *pursuit of research on the scientific assessment of animal welfare and animal suffering by AZA and its member zoos.

Near the end of the White Oak conference, an informal questionnaire was administered to participants; the questionnaire set up a number of hypothetical, but realistic, field and captive situations, and asked participants to make choices from among several different actions. The following issues showed a high degree of consensus: strong disapproval of breeding infant animals to attract visitors; strong disapproval of unplanned breeding; support for captive breeding of endangered species; support of *in-situ* conservation for a given species even if it involved euthanasia of captive hybrids of that species (when given an either/or choice); removal from the wild to captive breeding of an entire small population of rhinos soon to be targets of poachers (no threats to the habitat would result from their removal); strong support for the use of immunocontraception, rather than hunting or sharpshooting, to control a high-density, relatively isolated deer herd in a suburban area; strong approval of reintroducing captive-bred tigers to a secure habitat, even though 80% would be expected to die (Center for Animals and Public

Policy, 1994).

An issue of total disagreement was using sport/trophy hunting permits to fund preservation of a large African wildlife area, even though the hunting would be limited, and the money would go to the local residents in exchange for being conservators of the area. Zoo/conservation participants approved strongly, and animal protectionists disapproved strongly. The economic use of wildlife to justify its existence is an area of major difficulty between the two groups; animal protectionists are opposed to it because they feel, with some justification, that it is inhumane and eventually destructive of the species it purports to protect (Hoyt, 1994), while zoo professionals and traditional conservationists tend to feel that economic use can be a powerful incentive for conservation, especially in developing countries.

The zoo profession and the mainstream animal protection community (though not radical animal rights groups) agree on some of the most fundamental issues facing zoos and conservation today, and even on many of the methods of dealing with those issues. Areas of greatest disagreement at the Atlanta conference tended to be on 1) "whether there is a strong moral presumption in favor of leaving wild animals free; if there is such a case, captive breeding programs are justified only under some limited conditions;" and 2) questions of population regulation and surplus animals (Norton, et al., in press). The conclusion, however was that zoos can and must undertake captive breeding programs in many situations, as long as they are "(1) carried out in a way that respects individual animal welfare, (2) justifiable as part of a broader conservation program designed to perpetuate the species in the wild, and (3) based on some reasonable hope that the captive breeding program will lead to augmentation of wild stocks or to reintroduction into the wild at some future time." (Norton, et al., 1995). These conclusions were based in part on the agreement of the participants that we must act now to save many species, or they will disappear; and that humans, as the cause of the biodiversity crisis, have a moral obligation to respond to it.

RECOMMENDATIONS FOR FUTURE STRATEGIES

1. **Continue the process of finding common ground.** Given the agreement on many key issues, the discussion should shift to **a) areas where significant disagreement remains**, such as the surplus problem, the individual/species conflict, and the economic use of wildlife as an

incentive for conservation; **b) specific issues of difference under broader topics of agreement**, for example, the question of predator/prey interactions in mixed species, naturalistic exhibits (both groups agree on the desirability of naturalistic, and, where possible and humane, mixed species exhibits); and **c) areas where both functionally agree but the issue has not been confronted**, such as euthanasia of surplus animals; neither group wants to kill, but it may be the only humane choice in certain circumstances. In addition, suggestions made at the Atlanta and White Oak conferences for formal liaison between zoos and animal protection groups, adoption of a flagship species approach to both ex-situ and in-situ conservation, and other topics could be explored.

2. Work together on joint projects in areas of agreement. Such projects could have significant effects on field conservation, relieve the suffering of many animals, and help the zoo profession deal with the substandard zoos which reflect badly on all zoos.

a. A legislative/regulatory project to address non-accredited, substandard facilities, such as roadside zoos. Neither the AZA nor the animal protection community can impose standards on regressive zoos, but together they could have more influence in working with USDA and Congress. One elegant, simple solution would be to create a regulation or, if necessary, pass a law requiring animal exhibitors to be accredited by AZA before USDA permits would be granted under the Animal Welfare Act. Such a provision would have the effect of either closing substandard exhibitors or forcing them to improve. It could be implemented in a variety of ways, ranging from getting USDA more money for enforcement (as the animal protection community has done for the National Institutes of Health in the evaluation and approval of alternatives to animal testing for medical research and consumer product safety), to setting up a quasi-government agency, composed of appointees from AZA, animal protection, and USDA. Another approach would be to have the zoo profession and animal protection groups work with USDA to improve standards for animal exhibitors under the Animal Welfare Act, a process which the AZA has already started (REFERENCE). This approach would need to include getting

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- USDA more money for enforcement to be successful.
- b. **A sourcebook of captive animal welfare.** A suggestion of the Atlanta conference, AZA and animal protection organizations should work together to produce a sourcebook which compiles existing scientific assessments of animal welfare and suffering, and distribute it to AZA members and others if appropriate.
 - c. **Design and implementation of a zoo-based research program on the scientific assessment of welfare and suffering** by the AZA, with the advice of animal protection groups.
 - d. **Evaluate existing zoo education programs, and if necessary and possible, design better ones.** Animal protection groups could help support, both financially and in an advisory capacity, the development of more effective zoo education programs, as they have, with other issues, such as immunocontraception of free-roaming wildlife (HSUS) and improving literacy in school children (MSPCA). The HSUS, for example, has an education division that could be helpful to zoos in designing programs. But the crying need here is for research to evaluate both formal and informal zoo education, in terms of what messages visitors take away and how effective those messages are in generating support for conservation. A related question to be explored is whether zoos can be effective in motivating visitors to support conservation. After this evaluation, research should be conducted on the best ways to design and implement education programs to achieve those ends, if the potential exists.

Animal protectionists have a great deal to gain from supporting zoo-based education: accredited zoos attract more than 100,000,000 visits each year. If even 10% could be reached with an effective conservation message, the political outlook for protecting species and ecosystems would brighten considerably.

The zoo profession would also have a great deal to gain: some assurance that money spent on education programs

is not money thrown away. They could also find out whether currently accepted practices (such as naturalistic exhibits) and visionary concepts (such as the biopark) are or could be effective in education, before further investing huge sums of money. If education is not effective, and cannot be designed to be effective, then its funding should be redirected, preferably to field conservation.

- e. **Explore using education and exhibit design skills in both living and nonliving exhibits to raise money for field conservation.** This approach would capitalize on the existing entertainment component of zoos and might be easier to achieve than teaching conservation values. It may be impossible to turn casual visitors into conservationists, but it might be comparatively easy to get them to donate money to field projects that are directly addressing the problems highlighted in the exhibits.

3. The animal protection community

- a. **Animal protection groups need to make a distinction between productive or progressive zoos and unproductive or regressive zoos.** Progressive zoos are responsibly and professionally managed facilities making contributions to field conservation, captive breeding and reintroduction, education, and research. Regressive zoos/exhibitors are those making few or no such contributions, and whose animals are housed in inhumane and inappropriate displays, such as roadside zoos, menageries, and bear parks.
- b. **Animal protection groups need to acknowledge that massive changes are taking place in the way progressive zoos do business.** Animal protectionists' messages, for whatever reasons, are being heard; zoos have stopped talking only to themselves, and have entered the wider world of conservation. But these changes are recent and not widespread throughout the zoo world. Supporting progressive changes and the zoos that make them will go further towards achieving animal protectionists' conservation objectives than anti-zoo campaigns. Another consideration is that traditional wildlife management, with its orientation

toward producing harvestable surpluses of huntable animals, is also being exported to habitat countries. The conservation biology orientation of the zoo profession is far more desirable in implementing field conservation projects. I am **not** suggesting that animal protectionists should withhold criticism of progressive zoos or the AZA where it is warranted. What I am suggesting is that they first work **with** progressive zoos and the AZA to address problems, before deciding to attack.

- c. **Animal protection groups need to recognize the limited powers of AZA.** Rather than criticizing them for not doing enough, they should work cooperatively with them in areas of common interest, such as regulation of substandard facilities and promotion of field conservation.
- d. **Animal protection organizations have a great deal to gain from financially supporting specific zoo-based field conservation, captive breeding, and education programs.** Besides helping to achieve animal protectionists' conservation goals, there are other potential benefits. Zoos are enormously popular with North Americans, and progressive zoos are trusted by them, both in terms of their expertise about and their goals for wildlife. More members of the public are probably more willing to support zoo-based field conservation, or field conservation supported by a consortium of zoos and animal protection groups, than efforts by animal protection groups alone. In some cases, zoos already have or are acquiring the staff, infrastructure and financial resources to carry out field conservation projects; some animal protection groups may have the funds, but do not have staff and infrastructure. Animal protection groups could gain a much broader potential base of support for their conservation goals, and have a greater chance of achieving them, by working with accredited zoos.
- e. **Animal protection groups may need a greater recognition of the fact that actions taken to benefit a species may not always be in the best interests of individuals.** Whether in capturing wild individuals to create a breeding program, or allowing sustainable use of a species to aid its survival,

the tension between survival of individual animals and survival of a species may never be completely resolved. As in issues involving the tension between human liberty and its legal restriction for the protection of society, these decisions must be made over and over again, on a case-by-case basis, and may at times move more in the direction of individual sacrifice than any of those involved would wish. I am not recommending, however, that animal groups refrain from pointing out ways in which the sacrifice of individuals could be lessened or avoided, or opposing poorly-thought-out projects. Conservationists can sometimes take the sacrifice of individual animals for granted, without enough thought about ways to avoid it.

4. The zoo community, including AZA

- a. **The zoo profession should learn to distinguish between animal protectionists who are, in the words of Roger Caras, “open to discussion, reason, and compromise,” (Caras, 1995) and those who are not.** The former group has scientific expertise and sophistication in wildlife issues, and many of their conservation and captive animal welfare goals are identical or similar to the zoo profession’s. I would suggest that such organizations would include, but not necessarily be limited to, the AHA, HSUS, WSPA, ASPCA, AWI, and, on a state level, the MSPCA. The zoo profession should continue its dialogue with these groups and expand it, if possible, into cooperative projects.

I believe that the zoo profession also needs to become less defensive. Such tactics as refusing to let animal groups have access to Animal Exchange, to allow them to make an independent assessment of the surplus problem, only result in distrust and a conviction that zoos have something to hide. Such action may also result in wildly inaccurate published estimates of the problem based on partial information the animal groups get through other channels. (This suggestion applies also to animal protection groups; excluding the AZA from receiving Monitor materials creates the same problem.)

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- b. **The zoo profession should continue its impressive efforts at self-evaluation, and its movement in the direction of field conservation and the reorganization of *ex-situ* programs and facilities to support field programs.** As the AZA recognizes, these changes will take a great deal of education and promotion within the profession, starting with zoo directors, boards, and major donors, regarding their urgent necessity.
- c. **A critical part of the profession's self-evaluation is an honest and unwavering look at zoo education, formal and informal.** The scarce empirical data that exist suggest that zoo education is not very effective in producing conservation-minded citizens. A hard look needs to be taken at whether zoos can effectively motivate visitors to support conservation. If so, then programs almost certainly will need redesign and more resources devoted to them. If not, zoos should redirect the money elsewhere, preferably to field conservation projects.
- d. **In cooperation with animal protectionists, zoos need to continue their efforts to define the nature and extent of the surplus problem, and to resolve it.** This process should include the issue of euthanasia of surplus animals, and possibly include a joint review of AZA guidelines on whether and in what circumstances it should be used. Animal protection organizations and wildlife rehabilitators have been dealing with euthanasia of domestic animals and native wildlife for many years; their standards, guidelines, and expertise might be of considerable use to the zoo profession in grappling with this issue.
- e. **The AZA and progressive zoos must take a public and consistent stand against regressive zoos, which they have so far failed to do, despite the repugnance which many responsible members of the zoo profession feel for these facilities.** In addition to building trust with animal protection groups, such an action would allow progressive zoos to distance themselves from roadside zoos and menageries, who besmirch the reputation of the zoo profession and represent a view of animals characterized by domination,

superiority, and control.

- f. The zoo profession needs to realize, if they have not already done so, that economic use of wildlife as an incentive to preserve it can be destructive. A continuing dialogue with animal protection groups should be undertaken on this issue, understanding that the divisions are deep and progress will be slow. One area of potential agreement that should be explored is promoting tourism as a economic use of wildlife.
- g. As the AZA realizes, the zoo profession needs to work more closely with conservation groups doing international habitat protection, and to develop ways of coordinating projects to avoid duplication of effort and waste of scarce resources.
- h. AZA should continue and expand its contacts with public policymakers. The public arena is one where many crucial decisions are being made about protective laws and regulations and financial support of conservation. A striking example of the successes that are possible is the recent support of the Congressional House Speaker, not heretofore a noted conservationist, for biodiversity protection.
- i. Zoos have great potential to raise private funds to support field conservation; they should continue and expand this effort. As stated above, zoos are popular with and trusted by the public; given the current environmental backlash, they are probably far more trusted presently than are traditional conservation organizations. They also have a large, ready-made target audience of both individuals and corporations.

CONCLUSION

Time is short and the river rises. Greater cooperation can lead to more successes in wildlife conservation, a field that needs them badly, and alleviate enormous animal suffering. Failure to do so will confirm the immortal words of Pogo, "We have met the enemy, and he is us."

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THE RESPONSIBILITY TO CONSERVE WILD SPECIES

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Until the development of urban society, the lives and deaths of wild animals and people were inextricably intertwined. People killed and consumed animals, and vice-versa. This interdependence is reflected in the cultural importance given to wild animals, whose symbolism reflected the observed characteristics of animals in a range of traditional cultures. As human beings increasingly buffered themselves, both technologically and culturally, from the actions of wild animals, and concomitantly were able to control the lives of these animals, the relation changed. The evolution of that relationship, as expressed in philosophy, literature, and scientific thought, has been explored in this conference. This essay addresses this same relationship, but has a narrower focus: In the modern, increasingly urban society how should we treat wild animals? Most of us personally experience wild animals only through cultural lenses such as nature shows on television, or as interesting but vaguely threatening presences during vacation forays into the rural landscape. A more precise question is what is the ethical justification for people living in the urban society to intervene in the lives of wild animals? This leads into a final question: What kinds of intervention are justifiable?

I will address these questions from the perspective of a conservationist, more precisely one who accepts Aldo Leopold's (1949:224-225) premise that "A thing's right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise." This statement can be supported from both the utilitarian position — that to do otherwise would endanger the resource base upon which human society depends — or from a more biocentric position — that wild species, and the natural world in general have an inherent right to exist. Conservationists have tended to synonymize integrity, stability, and beauty. A biotic community that has "integrity"

has the full diversity of species, which allows the system to function ecologically in an appropriate way. The “stability” of the community, both its resilience to disturbance and its persistence through time, depends on that species diversity. And conservationists consider “beauty”, while the term is not in the scientific lexicon, to be defined by that diversity and stability. For Aldo Leopold, people were an integral part of this biotic community, and anthropological research has documented the role that traditional cultures play in creating and maintaining biological diversity in many natural communities. Yet it is also clear that in our present world, the actions of both modern and traditional cultures generally tend to degrade natural systems and reduce biological diversity. The present-day rate of species extinction is perhaps higher than at any time in our planet’s existence, and the actions of human beings are the single largest contributor to this global degradation.

The impact of humans on the rest of the biota is ubiquitous. Terms like “primeval”, “virgin”, “primary”, “undisturbed”, “pristine”, even “wilderness”, all of which connote biological communities uninfluenced by humans, refer to a certain ideal unattainable in the modern world. From the high deserts of Chang Tang in Tibet to the depths of the tropical forest in central Amazonia, the human presence is everywhere discernible. This is not to state that all nature is a human construct. It is not. Excepting biological communities in urban and agricultural settings, the structure and functioning of biological communities is still predominately determined by species other than humans. But humans do have a pervasive impact on wild species worldwide, and this defines how we must treat wild species. Few truly “wild” species — those uninfluenced by humans — exist today on our planet. And thus we cannot abnegate all responsibility for the fates of individual animals or for the continued existence of the species — they cannot be left “to do their own thing.” We must take responsibility for our influence on the lives of wild animals.

Our primary responsibility, if we accept Aldo Leopold’s premise, is to ensure the survival of species in nature. The least intrusive action is to establish protected areas — parks and reserves for species and the biological communities on which they were a part — and then minimize human impact within these areas. Even here, human impact in and around reserves is significant, and active management is usually necessary to maintain the biological community. Population manage-

ment, predator restoration, habitat modification, and landscape restoration are necessary tools for protected area managers, and all have an impact on wild species.

More intrusive conservation actions are frequently necessary. If the goal is the preservation of biological diversity, protected areas alone are insufficient. First it is unlikely that we will be able to protect more than a small fraction of the planet's surface in parks and reserves, and the long-term persistence of many species and communities requires larger areas. Second governments and regulatory agencies are unable to protect areas if local human inhabitants and other interested parties do not support the park or reserve. Park personnel tend to be inadequately funded, supported, and trained. Through political machinations or illegal actions, local peoples can undermine the best efforts of park managers — as evidenced by the recent difficulties experienced by the U.S. National Park Service and the Forest Service. Accordingly conservationists frequently advocate working outside protected areas, and enlisting the support of local communities in conservation efforts in and around protected areas. Local community involvement requires that local people value wildlife species, and frequently this means allowing them rights to harvest or otherwise use wild species and wild areas. This approach is considerably more intrusive because it involves treating wild animals as resources. It is also controversial because the consumptive use of wild species is seemingly in conflict with the goal of protecting them. However it is clear that allowing local people to exploit a species in certain circumstances can vest them in the process of conserving wild species or biological communities.

Another potentially justifiable intrusion is to bring wild animals into captivity. When wild populations are imperiled by habitat conversion, when animals cannot be protected from hunters, or when other species endanger remnant populations, then bringing animals into captivity can be the most responsible action. The removal of the last condors from the wild in California was justified using this argument. Zoos in particular have assumed the responsibility of maintaining populations of endangered species, and have become involved in reintroducing animals back into the wild when circumstances are more favorable. Successful reintroductions attest to the utility of this approach — including the efforts of my own institution, when called the New York Zoological Society, in reintroducing bison to the American west at the beginning of this century. Zoos have also brought animals into captiv-

ity with the expressed aim of introducing living animals to a generally urban public and educating them on the need for conservation, in effect using individuals as “ambassadors” for their species. And in the United States, some 100 million people annually visit zoos, and some 14 million participate in formal zoo education programs.

In this essay, I have not addressed our responsibility to the welfare of the individual animals of a species. If the goal is to preserve the biological community, then the survival of a species takes precedence over the welfare of selected individuals of the species. Human actions which promote the conservation of a species or a population at the expense of individuals are justified. The welfare of the collective as a whole is more important than the welfare of any one individual. However even from this perspective, there are circumstances in which the individual welfare of an animal attains importance. As animals become rarer, we value individual animals more, and thus the mechanism to conserve species increasingly depends on protecting individuals. For instance, consider the proposed establishment of tiger farms in China to provide bones for the traditional medicine trade, or the proposed harvest of black rhinos in southern Africa for the horn trade. In both cases, arguments have been made that these actions would promote conservation of the species. Yet populations of these species are now so tiny, and the risks to the population of harvesting are so great. Our efforts to conserve these species depend on our success with protecting each individual, and such proposals have received little support within the conservation community.

I have argued that human beings are ethically justified in intervening in the lives of animals if it promotes the conservation of populations or species. Are all kinds of interventions justifiable? From a conservation perspective, the answer is yes. But this answer is incomplete. There are humane considerations that in practice are included. If wild animals are to be harvested then the humaneness of their killing must be considered. The conservation perspective also does not consider the extent to which a wild species is sentient, yet the actions of conservationists frequently reflect a sensitivity to this issue. For instance, no proposal to bring the mountain gorillas into captivity has been advanced, not even during the recent human tragedy and political unrest in Rwanda. The agonized debates about whether to support harvests of elephants and whales within the conservation community also reflect deep concerns about animal sentience.

The reality that human beings significantly influence the natural world, either directly or indirectly, means that we must take responsibility for the survival of wild species. The inescapable consequence of this is the active management of individual animals, populations, and communities. The more humans intervene, the more responsibility they must assume, and as wild population dwindle, the more responsibility we must take for individual animals. And this creates the paradox. The ultimate goal is to preserve the natural world, and the wildness that defines it. Yet the methods we use to conserve species, and care for individual animals, can rob animals of the wildness that we value in them. But to do otherwise is irresponsible.

LITERATURE CITED

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