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Interspecific Affection in Animals

The article on baboon stroking kittens and making pets of them (Int J Stud Anim Prob 21(1):78, 1981) is quite interesting. The care of offspring and the family is said by some writers to be instinctive and automatic but when we attain a feeling of comfort and pleasure, from their we are concerned with behavior outside of the usual and which does not lead to the usual evolutionary results, that is to parasites somewhat like the cowbirds of which one was part Brahman, itself and it seems to me that any animal/human relationship into one of mutual beneficence.

It strikes me as unrealistic as well as counterproductive to the welfare of animals to foster handicap or infirmity fall within the Protected type: the mentally ill, the mentally retarded, women, children, the elderly.

Groups that have been perceived and singled out as a threat to the majority from whom society must be protected constitute the Combattable type: criminals, the mentally ill, juvenile delinquents.

Groups that are permitted to remain in a disadvantaged state for purposes of exploitation comprise the Exploited type: blacks and other racial minorities, ethnics, women.

A minority may fit as well in one category as another. For example, the mentally ill can be thought of as a Protected minority on the premise that they need special help and protection. On the other hand, they may also be perceived as a threat to others and so fall into the Combattable category. Women, who historically have been perceived as the weaker sex, initially would be of the Protected type similar to children. The cause of much continued discrimination however, would appear to be to retain male advantage, and hence they propitiate those not and it is a great deal of effort and expense on our part. A crucial question, however, is, "Do we have a right to expect something in return?" It would be hypocritical, of course, to argue that factory farming and practice is anything more than simple exploitation. On the other hand, death is a price we must pay for living. I take moral responsibility for the humane slaughter of two cows a year. These cows receive my daily attention for fifteen months, and I believe that meat is not the reason for their deaths. I believe them to be a great deal of help and provision that any animal/human relationship could make it on its own. In the end, their flesh on my table costs me more in actual dollars than meat bought in the store. But economy is not the purpose; rather some balance which converts an exploitative relationship into one of mutual beneficence.

I find it much more difficult to make any such argument for the justification of animal experimentation. It seems to me that any animal/human relationship must strike some sort of balance of mutual benefits—benefits to the animals as a result of the efforts of the custodians and to protect and help those groups in need of it do not become a self-serving tyranny; or that efforts to defend against the dangerous or destructive are not vindictive. On the other hand, benefits which accrue to the custodians in the care and treatment of Protected and Combattable groups do not necessarily constitute exploitation, so long as the rationales are not merely fabricated to justify such benefits. Is it the relationship between some pets and pet owners one of mutual benefit and not one of exploitation (although, of course, it could be)?


Letters

Interspecific Affection in Animals

The article on baboons stroking kittens and making pets of them (Int J Stud Anim Prob 21(1-4), 1981) is quite interesting. The care of offspring and the family is said by some writers to be instinctive and automatic but when we attain a full understanding of these matters they most likely will be seen to develop from simple senses which give feelings of comfort and pleasure, from the simple, primitive worms coiled about their eggs, to the modern man caring for his family in fulsome love.

In the kitten-baboon case, however, we are concerned with behavior outside of the usual and which does not lead to the usual evolutionary results, that is to the reproduction of a given species. Cats are so constituted that they act as parasites somewhat like the cowbirds and cuckoos of the Americas which the protector is unwilling to accept.

I once saw a group of three cattle in Austin, Texas of which one was part Brahman, as the Texans call the Zebu cattle from India. One was obviously the dominant one and the owner, who was Professor of Physiology at the University of Texas, told me that it was of higher intelligence and it "took care" of the other two.

Some years ago at the monkey island in the San Antonio Zoo there was a most interesting situation involving three species of monkeys, none of which I knew nor did I make an attempt to find out. First was a small-tailed monkey and another about twice as large which was reputed to fight and beat up on the smaller species. However, I never saw this happen because there was one large monkey in the same compound around which the smaller monkeys hovered in close attendance. He was a fairly small short-tailed monkey about the size of the Gibraltar ape and he savaged any of the medium-sized monkeys that interfered with the smaller ones in any way. He moved in a slow, lordly manner with many of the smaller monkeys around him, some even sitting between his forelegs. He showed no affection for the smaller simians and in fact accorded them the most magnificent neglect. Nevertheless, he was the respected policeman and so far as body movement went he was accorded every deference. This is a plain case of care and protective behavior crossing species lines.

The most striking example of care and cross-species kindness was shown in two photographs relatively recently in the National Geographic. The pictures were taken along the southern reaches of South America and showed the relatively huge body of a southern elephant seal female upon which a brash southern fur seal youngster had ensconced himself. The next scene showed the big female rolling the impertinent youngster off, but holding him carefully with one flipper against the side of her body so that he would not fall too far. This is certainly an instance of protection and care shown for a specimen not of the same species. It did not involve petting or fondling, but the tolerance and kindness stand out.

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Animals as a Minority


In it, we suggest that for analytical purposes minorities can be categorized on the basis of the overriding rationale behind their unequal treatment: The Protected, The Committed, and The Exploited.

Groups that have been perceived and singled out as in need of help or protection have had the handicap or infirmity fall within the Protected type: the mentally ill, the mentally retarded, women, children, the elderly.

Groups that have been perceived and singled out as a threat to the majority from whom society must be protected constitute the Committed type: criminals, the mentally ill, juvenile delinquents.

Groups that are permitted to remain in a disadvantaged state for purposes of exploitation comprise the Exploited type: blacks and other racial minorities, ethnic groups.

A minority may fit as well in one category as another. For example, the mentally ill can be thought of as a Protected minority on the premise that they need special help and protection. On the other hand, they may also be perceived as a threat to others and so fall into the Committed category. Women, for example, who historically have been perceived as the weaker sex, initially would be of the Protected type similar to children. The cause of much continued discrimination, however, would appear to be to retain male advantage, and hence they would probably fit more accurately fall in the Exploited category.

Animals clearly could be placed in all three categories. Some animals need protection, some animals are dangerous or destructive and some animals play an essential role in our economy.

The crucial element of justice, of course, is to insure that efforts to protect and help those groups in need of it do not become a self-serving tyranny; or that efforts to defend against the dangerous or destructive are not vindictive.

On the other hand, benefits which accrue to the custodians in the care and treatment of Protected and Committed groups do not necessarily constitute exploitation, so long as the rationale is not merely fabricated to justify such benefit. Is it the relationship between some pets and pet owners one of mutual benefit and not one of exploitation (although of course, it could be)?

It strikes me as unrealistic as well as counterproductive to the welfare of animals to foster animal liberation. This is a cruelty we certainly would not impose on our children, the mentally ill, or other groups in need of protection.

For better or worse, the fact is we have created a world in which the vast majority of animals cannot make it on their own. They need our protection which requires our subjugation of them as well as a great deal of effort and expense on our part. A crucial question, however, is, "Do we have a right to expect something in return?" It would be hypocritical, of course, to argue that factory farming as presently practiced is anything more than simple exploitation. On the other hand, death is a price we all must pay for living. I take moral responsibility for the humane slaughter of two cows a year. These cows receive my daily attention for fifteen months, in to shine, but destruction of some animals is anything more than simple exploitation.

In the end, their flesh on my table costs me more in actual dollars than meat bought in the store. But economy is not the purpose; rather some balance which converts an exploitative relationship into one of mutual beneficence.

I find it much more difficult to make any such argument for the justification of animal experimentation. It seems to me that any animal-human relationship must strike some balance of mutual benefits—benefits to the animals as a result of the efforts of the custodians against benefits to the custodians. Experimentation typically goes far beyond the custodial care required by the animal; hence the experimenter exercises more than mere protective custody. The animal is a means to an end in a clearly exploitative relationship, unless the experiment is in some way required by or beneficial to the animal itself.

Edward G. Ludwig
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Getting Educated at the Zoo

Nancy Heneson

In this issue we present three papers that deal with the subject of the zoo. Although the focal concern of each paper is different and the positions of the authors range from whole-hearted support of the institution to frank skepticism, all express a belief in the potential educational value of zoos. This editorial, however, has a different premise. It is not meant to criticize the other papers, but rather to raise questions from another point of view.

"Educational value" has a fine, humanistic ring to it; as a principle it would seem inviolable. Yet when the means to this admirable end involve the kind of exploitation inherent in the exhibiting of wild animals in confinement, one begins to wonder just what sort of education is being provided, and further, whether even the most idealistic rendition of the educational benefits of zoos can silence the larger ethical questions.

The first question, what sort of education is being provided?, has no definitive answer. One cannot crawl inside the mind of every visitor to every zoo. Thus the answers tend to be prescriptive rather than descriptive (but see Ludwig, this issue), e.g.: Seeing live animals in the zoo should (will) increase one's awareness and appreciation of other life forms, enhance one's respect for wildlife, encourage an interest in and commitment to conservation and provoke a vital connection with "Nature" in an ever more sterile technological society. There can be no doubt of the nobility and importance of these aims, and it would seem that a major part of the effort to upgrade the facilities and change the image of zoos has been directed toward making this type of educational experience more accessible. A person who sees an ocelot pacing in a bare, tiled cage behind some vegetation in a naturalistic enclosure adds a dimension of education that is missing from a sign whose entire message is "Educational value" has a fine, humanistic ring to it; as a principle it would seem inviolable. Yet when the means to this admirable end involve the kind of exploitation inherent in the exhibiting of wild animals in confinement, one begins to wonder just what sort of education is being provided, and further, whether even the most idealistic rendition of the educational benefits of zoos can silence the larger ethical questions.

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However, too often the needs of the animals are subordinated to, or even confused with, the esthetic sensibilities of the public, and the result may be simply the erection of a country-club jail where Attica once stood. At a cost of $2.9 million, the National Zoo in Washington, D.C. replaced small, barred cages with a new Great Ape House—glass enclosures, artificial tree trunks of concrete with branches of fiberglas, heated, easy-to-clean epoxy grit floors, and plenty of greenery in the viewing area only. Minus the gorillas and orangutans, the place looks like your average solar house in Marin County. Gorillas, unlike oranges, do not brachiate, and spend much of their time in the wild foraging among the vegetation of the tropical rainforest. For them, the "trees" seem to serve the same purpose as a mink stole thrown over the shoulders of a 1930s starlet posing for a publicity shot—they enhance the total effect. They are also much nicer for people to look at than a swinging tire.

There is no dearth of educational aids in this exhibit: display panels discussing habitat, geographical distribution, evolution, social and feeding behavior in captivity and in the wild, breeding and rearing of infants in captivity, and smaller panels with biographies of the individual inmates. However, most people come to look at the animals, to walk right up to the two-way glass and experience whatever it is they

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Productivity and Farm Animal Welfare

Michael W. Fox

In the search for and debate over objective indices of farm animal welfare, productivity is regarded by many animal scientists and others in the livestock industry as the most reliable measure of an animal's overall well-being and adaptability. On the surface, this would seem to be so, as productivity—in terms of growth rate, milk yield, feed-conversion and egg production—can be easily quantified. However, there are serious flaws in this assumption.

An increase in productivity may not be correlated with improved welfare or over-all well-being. It may be attributable to genetic selection, higher protein intake, increased photoperiod, or a number of other husbandry and management variables. A decrease in productivity does not necessarily correlate with a decline in welfare standards or over-all well-being. Some husbandry systems are less efficient and their productivity lower because the animals are fed more roughage, for example, or are of a less productive genetic strain. A reduction in calcium or sodium or a decrease in illumination will dramatically depress egg production, while overall welfare is not jeopardized.

High productivity may actually jeopardize an animal's overall welfare, as exemplified by the so-called production-related diseases (Sainsbury & Sainsbury, 1979) of high-yielding dairy cows, as well as fast-growing pigs and broilers.

Antibiotics, growth stimulants, and other drugs may mask health- and welfare-related problems and lead to spurious correlations between welfare and production.
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However, too often the needs of the animals are subordinated to, or even confused with, the esthetic sensibilities of the public, and the result may be simply the erection of a country-club jail where Attica once stood. At a cost of $2.9 million, the National Zoo in Washington, D.C. replaced small, barred cages with a new Great Ape House—glass enclosures, artificial tree trunks of concrete with branches of fiberglass, heated, easy-to-clean epoxy grit floors, and plenty of greenery in the viewing area only. Minus the gorillas and orangutans, the place looks like your average solar house in Marin County. Gorillas, unlike oranges, do not brachiate, and spend much of their time in the wild foraging among the vegetation of the tropical rainforest. For them, the "trees" seem to serve the same purpose as a mink stole thrown over the shoulders of a 1930s starlet posing for a publicity shot—they enhance the total effect. They are also much nicer for people to look at than a swinging tire.

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It is possible to display animals in settings more suited to their needs than the one described above (Hancocks, 1980). However, even if nearly optimal conditions for the achievement of educational goals could be reached, one can still question whether the value of education justifies the existence of zoos. How can respect for wildlife be instilled through an institution that exploits the object of purported respect? It is just possible that the ultimate educational message transmitted by a zoo, of whatever caliber, is that it is all right to subject animals to the often fatal stress of removal from the wild, all right to confine them, and all right to make sacrifices (the real meaning, not the scientist's euphemism) of them in the hope (or is it rationalization?) that contact with them through bars, glass, or even directly will raise the quality of life and the consciousness of human beings.

The fact that zoos exist is in itself an education. How the animals fit in, as can be seen from this editorial and the three papers to follow, is a matter of opinion.

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Antibiotics, growth stimulants, and other drugs may mask health- and welfare-related problems and lead to spurious correlations between welfare and production.
It is as risky to assume that a high production index is indicative of adequate welfare as it is to assume that low productivity is a sign of ill treatment. For example, store-feeding of beef cattle (in which cattle are kept at a low level of nutrition during the winter so that they just maintain their weight and are in good condition to make high rates of gain from grazing the following spring and summer) essentially mimics the natural seasonal cycle of reduced gain in winter, and as Raymond (1980) emphasizes, it is doubtful that there is any evidence that such cattle are under poor welfare conditions during maintenance winter feeding.

Taken alone, productivity cannot be regarded as a reliable indicator of animal welfare. Assessment of animal welfare entails an analysis of many factors, including health status, disease incidence, longevity, reproductive performance, physiological and behavioral indices as well as production records. This is the complexity that makes the science of animal welfare a challenging interdisciplinary subject.

References

Animals in Film and Television

D.B. Wilkins

Animals are entertaining. This undoubted fact has been exploited by human beings for centuries and to the commercial advantage of many people. The ways in which we have exploited both the natural and unnatural behavior of animals have varied from the straightforward exhibition of an animal in a zoo to the perversity of dog-fighting, in which animals are allowed to fight until one or other is killed or badly injured. Entertainment implies both amusement and enjoyment, and it is incredibly easy to realize that even within our so-called advanced Western civilization there still are people who can gain enjoyment from either directly torturing and killing animals or by witnessing animals inflict pain and death upon each other. North America and most countries in Europe have rightly condemned and outlawed bear-baiting, cock-fighting, and dog-fighting. There is no doubt, though, that these last two still have their followers and that organized events take place. The vast majority of people are appalled when they read stories of illegal dog-fights taking place, but there is any real difference in principle between that and bull-fighting in Spain, fox-hunting in Europe or the use of the cinch strap on horses in rodeos in North America? Each of these is a form of entertainment or sport which depends to some degree on the infliction of pain and suffering on animals.

One justification for “sporting activities” such as hare-coursing or dog-fighting is that the animals are behaving naturally. This must be a distortion of the truth as a fight between male dogs in the natural environment seldom ends in the death of the vanquished. Greyhounds and other similar breeds will always chase hares and will frequently kill them, but hare-coursing as a sport relies on the chase and the kill to take place before spectators. This requires an artificial staging of the event; therefore the natural factors that would control such happenings in the wild are no longer influential.

Other activities that involve animals suffering in some form or other are excused or justified by those people involved on the grounds that they are traditional. Recent advances in our ethological knowledge and an increasing public awareness of the humane issues involved have meant that one of the only arguments left in favor of a circus is that it is a traditional form of entertainment. Most hunting of animals is based on our ancestors’ method of obtaining food even though the end result these days is no longer necessary as a source of nutrition.

People have always had a fascination for large, “exotic” types of animals and as a result many zoos were set up all over Europe and North America. For many years there was a great deal of money to be made from exhibiting animals, and very little regard was paid to their welfare.

With the advent of cinema and television we have come to appreciate these animals in their own environment. Some modern zoos have attempted, therefore, to reproduce a type of natural surrounding for the larger species of animal, but the tendency to favor the viewing public rather than the animals has resulted in concern about the way in which animals are exploited for films and television. These are modern problems, and they come under two distinct headings.

The first is a moral one and concerns the effect of animal suffering, whether real or simulated, on the viewing public. This subject is of considerable concern to the medical profession, sociologists and also politicians because it is now accepted that violence toward humans depicted on the film or television screen can be reflected by violence in real life. Does the same consequence follow the showing of scenes depicting violence against animals? Recent studies have shown that children appear to be more disturbed by a scene showing physical damage to an animal than to a human. Apart from the psychological disturbance to a child or adult of witnessing violence toward animals, the other direct consequence could be to encourage certain people to copy what they see presented in front of them in the form of entertainment. This is not to say that any scene involving animal suffering should be automatically censored; it must depend on the way in which it is presented and the conclusions that can be drawn, either consciously or subconsciously. Although it is perhaps an oversimplification, one could follow the previously accepted approach to crime, namely that you can show a person robbing a bank, but you have to show that person being caught before the end of the film.

A film that sets out to depict the horrors of game-poaching in Africa and includes scenes where animals are killed and maimed by poachers is morally defensible on the grounds that it is designed to stimulate public outrage against poaching. Is it equally defensible, however, for the film-maker to hire poachers and then arrange for them to kill animals, in front of previously set-up cameras, in order for the film to be made? I do not believe so although some would argue that this was a borderline case.

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With the advent of cinema and television we have come to appreciate these animals in their own environment. Some modern zoos have attempted, therefore, to reproduce a type of natural surrounding for the larger species of animal, but the compromise between providing an animal with its natural environment and still allowing it to be seen by the public is not easy to attain, and there has always been a tendency to err on the side of the public. This tendency to favor the viewing public rather than the animals has resulted in concern about the way in which animals are exploited for films and television. These are modern problems, and they come under two distinct headings.

The first is a moral one and concerns the effect of animal suffering, whether real or simulated, on the viewing public. This subject is of considerable concern to the medical profession, sociologists and also politicians because it is now accepted that violence toward humans depicted on the film or television screen can be reflected by violence in real life. Does the same consequence follow the showing of scenes depicting violence against animals? Recent studies have shown that children appear to be more disturbed by a scene showing physical damage to an animal than to a human. Apart from the psychological disturbance to a child or adult of witnessing violence toward animals, the other direct consequence could be to encourage certain people to copy what they see presented in front of them in the form of entertainment. This is not to say that any scene involving animal suffering should be automatically censored; it must depend on the way in which it is presented and the conclusions that can be drawn, either consciously or subconsciously. Although it is perhaps an oversimplification, one could follow the previously accepted approach to crime, namely that you can show a person robbing a bank, but you have to show that person being caught before the end of the film.

A film that sets out to depict the horrors of game-poaching in Africa and includes scenes where animals are killed and maimed by poachers is morally defensible on the grounds that it is designed to stimulate public outrage against poaching. Is it equally defensible, however, for the film-maker to hire poachers and then arrange for them to kill animals, in front of previously set-up cameras, in order for the film to be made? I do not believe so although some would argue that this was a borderline case.
The example above brings me to the second problem which concerns the manner in which animals are manipulated in order that scenes can be created. The use of properly trained animals and modern filming techniques—clever editing, slow motion, models, etc.—should permit a film-maker to simulate almost every conceivable type of incident. In spite of this animals are frequently misused and the main reasons are ignorance and expediency. (Within the context of this discussion cruelty can be defined as the infliction of pain or distress on an animal for the purposes of a film. In addition, I believe that it is also unacceptable to place an animal in a situation where pain or distress is likely to be caused.)

Several recent films released in the U.S. and Europe demonstrate both the good and the bad use of animals. "Heaven's Gate" has attracted considerable publicity over allegations that horses were killed or injured in the re-creation of certain battle scenes. The film also included a realistic cock-fight. There is no doubt that the misuse of horses, in particular, was commonplace a few years ago, but the public is now less likely to tolerate such happenings, and public criticism is bad box office. For this reason alone, I believe the majority of film-makers are prepared to be extremely careful in the way in which animals are utilized. Nevertheless, it can be difficult to assess the acceptability of a particular scene. Individual welfarists and veterinarians sometimes hold contrasting opinions.

The film "Every Which Way You Can," produced and directed by Clint Eastwood, contains a scene which exemplifies the difficulties. This film received an "acceptable" rating from the American Humane Association, but its final version contained a scene in which a ferret and a snake were placed in a glass tank and allowed to fight. The reason put forward for justifying this scene was that neither animal suffered any physical damage as a result of the fight because of the precautions that were taken. The snake had been "defanged" and "milked" of its poison and in addition, its lips had been sutured together. This prevented the snake killing or damaging the ferret although there was, in my opinion, no justification for taking such steps simply to create a scene for a film. The snake, even though it is a reptile, is entitled to as much consideration as any other animal, especially when one is concerned over the condition of incident or injury. This prevented the snake killing or damaging the ferret although there was, in my opinion, no justification for taking such steps simply to create a scene for a film. The snake, even though it is a reptile, is entitled to as much consideration as any other animal. Fortunately, in the United Kingdom there exists legislation which is little understood abroad but which prohibits the exhibition or distribution of films in the production of which suffering may have been caused to animals, wherever in the world the film was shot.

The relevant paragraph of this Act stipulates the following: "1(1) No person shall exhibit to the public, or supply to any person for public exhibition (whether by him or by another person), any cinematograph film (whether produced in Great Britain or elsewhere) if in connection with the production of the film any scene represented in the film was organized or directed in such a way as to involve the cruel infliction of pain or terror on any animal or the cruel goading of any animal to fury."

It is therefore clear that it is not necessary under this law to have inflicted actual injury on the animal and, therefore, the scene described above had to be deleted before the film was licensed for general release in the U.K. Although this may be described as "shutting the stable door after the horse has bolted," it still provides another weapon in the fight to achieve humane treatment of animals used in films.

D.B. Wilkins Editorial

The use of drugs, particularly of the narcotic or tranquilizer type has become more widespread. In particular, they are being used as a means of producing a sedate or tranquil animal that is then possible to manipulate for a particular film scene. Some wild or aggressive animals can be filmed in close proximity to an actor or actress with the use of such drugs. Once again we are faced with the problem of what is permissible in the name of entertainment, and I believe that some members of the veterinary profession are at fault here. In my opinion, no drug should ever be used on an animal unless it is directly to the benefit of that animal. In other words, to administer a drug, even a tranquilizer which may have a wide safety margin, to an animal to enable it to be filmed is not justified. It is regrettable that many veterinarians will not only approve of this but also willingly become involved in such filming by helping to administer the drug and care for the animal. I say regrettable, because in the eyes of the producer or director of that film there would appear to be no moral or practical objection to such a use of animals if a veterinary surgeon was prepared to give it his or her approval.
The use of drugs, particularly of the narcotic or tranquilizer type, has become more widespread. In particular, they are being used as a means of producing a sedate or tranquil animal that is then possible to manipulate for a particular film scene. Some wild or aggressive animals can be filmed in close proximity to an actor or actress with the use of such drugs. Once again we are faced with the problem of what is permissible in the name of entertainment, and I believe that some members of the veterinary profession are at fault here. In my opinion, no drug should ever be used on an animal unless it is directly to the benefit of that animal. In other words, to administer a drug, even a tranquilizer which may have a wide safety margin, to an animal to enable it to be filmed is not justified. It is regrettable that many veterinarians will not only approve of this but also willingly become involved in such filming by helping to administer the drug and care for the animal. I say regrettable, because in the eyes of the producer or director of that film there would appear to be no moral or practical objection to such a use of animals if a veterinary surgeon was prepared to give it his or her approval.

Television has recently taken over from the cinema as the most popular form of visual entertainment and carries with it possibly even greater problems over the use of animals. There are very few live television programs, but where they do exist there is sometimes a temptation to introduce animals into the studio and to use them during the course of the program. With smaller budgets and less room for expenditure on animals, many television producers will attempt to use animals obtained from the general public rather than from animal experts. The result is that an untrained, inexperienced and quite frightened animal is placed in the strange surroundings of a television studio for the first time in its life. The resulting mental anguish, if not physical damage, must be quite extreme. It must surely be possible when filming a television program to anticipate this problem and either to use animals that are conditioned for indoor work, or within their own natural surroundings.

It is inevitable that the telling of stories or the portrayal of real life drama as depicted within the cinema or the medium of television must use animals from time to time. Because the use of animals is a means to an end and frequently only a small part of those means, there is a tendency for the manner in which these animals are used to be less than correct. Regrettably, many owners or handlers like to bask in the reflected glory when an individual animal is pushed into the spotlight in some way. Such personal ambition will frequently be allowed to override what otherwise would be an owner's or handler's normal compassion and regard for the animal in their charge. All these facts mean that there is tremendous responsibility on the part of the directors and producers of both television and film productions. Early consultation when a production is being planned with those who are going to provide the animals, those who are going to work with the animals, and experts in animal welfare, must take place.

The example above brings me to the second problem which concerns the manner in which animals are manipulated in order that scenes can be created. The use of properly trained animals and modern filming techniques—clever editing, slow motion, models, etc.—should permit a film-maker to simulate almost every conceivable type of incident. In spite of this, animal cruelty is frequently exhibited, and the main reasons are ignorance and expediency. (Within the context of this discussion cruelty can be defined as the infliction of pain or distress on an animal for the purposes of a film. In addition, I believe that it is also unacceptable to place an animal in a situation where pain or distress is likely to be caused.)

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Canadian Report on Humane Trapping

The Federal Provincial Committee for Humane Trapping (FPCHT), which sprang from a 1973 Canadian Federal Provincial Wildlife Conference, recently completed its report and recommendations based on research conducted from 1974-1981. The FPCHT, which coordinated a national humane trapping program, was formed in response to increasing concern over some of the methods employed in the trapping of wild fur-bearers. While the major impetus came from humane societies, government officials, politicians and the public also lent support and financial support to the work of the FPCHT. Thus, the report is the result of cooperation and compromise between groups with differing interests: the trappers' and wildlife officials' concern with the prosperity of the fur industry (which makes a significant contribution to Canada's GNP), and the humane societies' promotion of the humane treatment of animals.

Initially, the FPCHT was given a five-year mandate (1974-1979) which in 1977 was extended to 1981 as the enormity and complexity of the issue became apparent. The Committee's original intent was "...to recommend to provinces, traps and trapping techniques for all fur-bearers which will, insofar as the state of the science or the art will allow, provide the greatest 'humaneness' in holding or killing of fur-bearers and to maintain throughout the program communication with government, interested persons or groups and media." However, additional funding in 1978 enabled the FPCHT to expand its role to include support and initiation of research. A Scientific and Technical Subcommittee, comprised of scientists, trappers and representatives of humane societies, was created to appraise various traps submitted by inventors, to advise on research and to assess all technical information received.

The Subcommittee received 348 trapping inventions representing the three basic trapping systems that can be applied on the land or in the water: holding devices, killing-traps and snares. The holding devices, which include foot-snares, leghold traps and box-traps, are intended to restrain the land animal but not the aquatic animal. Killing-traps and snares kill animals either on land or underwater. Those traps recommended by the FPCHT received approval because they demonstrated the capability to provide a "humanene" capture or kill of an animal. The Committee's working definition of "humanene capture" is "...a capture during which an animal is held with minimal overt distress, and with minimal physical damage." "Humanene death" means "...a death during which an animal suffers minimal distress, which is achieved by rendering an animal unconscious and insensitive to pain as rapidly as possible..." (Out of a possible 104 choices of killing-traps that were tested by the FPCHT, the 16 approved ones had kill times ranging from near-instantaneous to three minutes.)

Other research conducted under the auspices of the FPCHT project included the study of the physiology of semi-aquatic fur-bearers, which comprise 50-70% of the animals trapped for their fur, and the relative humaneness of underwater holding- and killing-traps. Killings-nares were also investigated, as 30% of those animals trapped on land are caught in snares. The FPCHT also produced guidelines for the use of box-traps and leghold devices. One of the most significant statements of the report concerns the controversial standard steel-jawed leghold trap. "...[research and field studies have demonstrated that the standard steel-jawed leghold trap is nonspecific, causes injury in all species studied, and results in observable distress and probably pain in many individuals [full emphasis]..." FPCHT files contain letters from trappers whose motivation for working on new traps was dissatisfaction with legholds or even remorse for having caused suffering to animals they had trapped with inadequate devices in the past." (p. 129) The report also notes that recent evidence suggests an "excellent potential" for foot-snares for raccoon, fisher, lynx and bobcat. Selected FPCHT recommendations are presented below:

- That the jurisdictions accept the criteria for killing-traps, which are anticipated to be accepted as a national standard for humane animal traps through the Canadian General Standards Board;
- That work continue to develop more fully the trapping systems, especially in the following areas: field testing and development of sets; development and testing of holding devices for larger species; development of kil-thresholds (lowest level of energy applied at a given location which will consistently kill the animal) power-snares; completion of the assessment of the relative effectiveness of various snare-lock combinations; continuation of kill-threshold work for all species, including a continuing reappraisal and redefinition aimed at reducing acceptable time-to-death periods;
- That the jurisdictions recognize the importance of trapper-training;
- That jurisdictions be aware of the importance of a consistent performance in killing-traps, and that mechanisms be developed to monitor and maintain quality control in trap manufacture;
- That safety devices or mechanisms be provided with or incorporated into all modern killing-traps (except those designed for squirrel or weasel), to minimize the risk of injury to the trapper.

The full Report of the FPCHT (144 GP-1MP) is available from the Canadian Government Specifications Board, Hull, Quebec K1A 0S9, Canada.

Toxocariasis a Public Health Concern

Toxocariasis, known commonly as roundworm, is gaining recognition as a serious health risk for human beings, particularly for children who share their homes with one or more dogs. According to a report in California Veterinarian (37(7):17-18, 1981), toxocariasis is a threat to people who ingest the infective eggs of Toxocara canis found in grass, soil, feces and other materials. Infection caused by Toxocara eggs may take one of two forms: the classical visceral larva migrans (VLM) syndrome, or the ocular version (OLM), which may lead to retinal disease and serious loss of vision.

The most effective means of protection against toxocarial disease is prevention. Treatment of puppies as young as 2 weeks of age is recommended, as it is reasonable to assume that all newborn pups are infected with T. canis, transmitted to them from their mothers. Repeated treatments are necessary to avoid further infection that can subsequently develop from eating contaminated eggs in the environment. Lactating bitches, which may carry the infective ova in their milk and transmit it to the pups, should also be treated. T. canis infections have a lower incidence among dogs over 6 months of age, with risk decreasing with age (except for lactating bitches).

Children 1-6 years of age are considered most vulnerable to infection, as this age group most frequently exhibits pica, the habitual consumption of non-food items. According to one study, children with a history of pica were 20 times more likely to have elevated Toxocara antibody titers than those who did not have the habit. Exposure to infected pets certainly increases the risk, but infection may also result from ingestion of eggs in grass or soil from areas such as public parks, schoolyards and playgrounds with sandboxes.

INT J STUD ANIM PROB 26(6) 1981
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praise various traps submitted by inventors, to advise on research and to assess all technical information. The Subcommittee received 348 trapping inventions representing the three basic trapping systems that can be applied on the land or in the water: holding devices, killing-traps and snares. The holding devices, which include footsnares, leghold traps and boxtraps, are intended to restrain the land animal but kill the aquatic animal. Killing-traps and snares kill animals either on land or under water. Those traps recommended by the FPCHT received approval because they demonstrated the capability to provide a "humane" capture or kill of an animal. The Committee's working definition of "human capture" is "...a capture during which an animal is held with minimal overt distress, and with minimal physical damage." "Human death" means "...a death during which an animal suffers minimal distress, which is achieved by rendering the animal unconscious and insensitive to pain as rapidly as possible..." (Out of a possible 104 choices of killing-traps that were tested by the FPCHT, the 16 approved ones had kill times ranging from near-instantaneous to three minutes.)

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4. Most of the traps in use in Canada be modified or replaced.
   • That the jurisdictions accept the criteria for killing-traps, which are anticipated to be accepted as a national standard for humane animal traps through the Canadian General Standards Board.
   • That work continue to develop more fully the trapping systems, especially in the following areas: field testing and development of sets; development and testing of holding devices for larger species; development of kill-thresholds (lowest level of energy applied at a given location which will consistently kill the animal) for power-snares; completion of the assessment of the relative effectiveness of various snarelock combinations; continuation of kill-threshold work for all species, including a continuing reappraisal and redefinition aimed at reducing acceptable time-to-death periods.
   • That jurisdictions recognize the importance of trapper-training.
   • That jurisdictions be aware of the importance of a consistent performance in killing-traps, and that mechanisms be developed to monitor and maintain quality control in trap manufacture.
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INT J STUD ANIM PROB 2(6) 1981

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Mutilation of Farm Animals

The Farm Animal Welfare Council of the United Kingdom has published an updated report on farm animal mutilation. The Council defines mutilation as "any operation or procedures carried out with or without instruments which involves interference with the sensitive tissue or bone structure of an animal and is carried out for nontherapeutic reasons." The Farm Animal Welfare Council has recommended the lowering of the age limit for animals at which they should be treated, and that those persons who carry out such procedures be veterinarians. The Council stipulates that anesthetics should be mandatory for those animals that are castrated. The removal of teats in calves generally for cosmetic reasons should be performed only by a veterinarian in animals over 3 months of age. The Council also opposes the complete tail-docking of certain breeds of sheep for show purposes, recommending instead that at least 4 tail vertebrae be retained. The report also stresses that stockkeepers should have basic training in the performance of routine mutilations and that there is scope for expansion of training and certification in such procedures. (At this time in the UK, livestock husbandmen can obtain a certificate of proficiency in the husbandry of a particular species without, however, receiving specific instruction on mutilations in the course leading to certification.)

The report proposes banning the following procedures: freeze-dagging (removal of the fleece from ewes' vulva area using cryogenic substances; the short-tail docking of sheep; penis and tongue amputation; cockerel devoicing; and the hot-iron branding of cattle.

Vasectomy, surgical dehorning, disbudding of sheep and goats, and electroejaculation, though not strictly a mutilation, should be performed only by qualified veterinarians.

Livestock and the Weather

When Cole Porter penned the words of his immortal song, "It's Too Darn Hot," he was probably unaware that they revealed a similarity between the sexuality of men and that of boars. Just as Porter's "average man...much prefers his lovey-dovey to court when the temperature is low," your boar's lack of interest in his mate could be due to nothing but the weather. Researchers have hypothesized for some time the link between the unreadiness or inability of livestock to mate (and conceive) and climatic conditions, as evidenced, for example, by the effects of heat stress on spermatogenesis in boars. The influence of the physical environment on the wellbeing of livestock is becoming clearer as meteorologists and animal scientists collaborate. According to a report in the Veterinary Record (109:49-50, 1981), these interactions, once understood, may enable one to predict the rhythms of disease outbreaks based on correlations between past weather conditions and the incidence, location and seasonal occurrence of disease. Through observations and calculations of animal responses to the environment, preventive measures may be taken to control or minimize the incidence of stress, airborne viral infections and parasitic infestations.

Disposition of Pets in Wills

Last year a dog named Sido attracted considerable attention when he became the object of a legal battle between the San Francisco Society for the Prevention of Cruelty to Animals and the executor of his owner's estate. The owner had expressly stated in her will that after her death, Sido was to be euthanized by a veterinarian. The San Francisco SPCA intervened, taking custody of the dog and refusing to release him. A highly publicized lawsuit (Smith vs. Avanzino) filled by the executor of the will resulted in passage of a special state law to save Sido and a court decision invalidating the provision of the will.

Requests in wills for euthanasia of pets upon the owner's death are apparently not uncommon. Frances Carlisle, of the University of California School of Law at Davis, surveyed 25 veterinarians in the Los Angeles and San Francisco areas and found that 28% of them had been named in wills for this purpose (Calif Vet 35(7):26-27, 34, 1981). Carlisle goes on to outline for the benefit of the veterinarian the ambiguities in existing laws regarding the destruction of animals and points out the inadequacy in resolving conflicts involving strong public opposition to willed requests for euthanasia of pets.

Generally, all provisions in a will are to be enforced unless 1) the disposition violates public policy, or 2) the disposition does not reflect the true intent of the deceased. These exceptions yield three interpretations that can be used to bolster arguments against implementing willed requests for euthanasia of pets. First, as pets hold the legal status of personal property, and public policy dictates against enforcement of wills that provide for the wasteful or capricious destruction of the estate property, one could argue that destruction of pets would violate public policy. For animals with economic value, such a charge could more easily be established, as this exception most commonly refers to property with economic value. However, most pets are of little or negative economic value (they have to be housed and fed), and as there are no specific prohibitions against the destruction of property with no value, a court could rule against this kind of a challenge. In cases where one could not argue against the destruction of an animal that is regarded as having no economic value, one could appeal to the public policy against the capricious destruction of estate property. The killing of a companion animal may be considered capricious if alternatives such as adoption exist. A court could nevertheless uphold a provision to destroy the pet on the grounds that it is not capricious to euthanize an animal if the intent is to ensure that it will not starve as a stray or be subject to painful experimentation.

Second, the various state laws that protect animals from cruelty, neglect, abandonment and destruction may be considered applicable to the case at hand. In Smith vs. Avanzino, the court reasoned that although Sido was not abandoned, the dog should still be entitled to the same protection afforded an abandoned animal in California, i.e., a 10-day grace period before it can be killed, during which time efforts are made to place the animal. However, a court could reason just as easily that because an animal is not, in fact, abandoned (it is mentioned in a will), it is not a proper subject for statutory protection.

The third and most common method used to invalidate willed provisions for euthanasia of pets is demonstration to the court that the provision does not
While veterinarians are aware of the high incidence of roundworm infec-
tion in dogs, only 54% surveyed said that they advised their clients of the
risks of human toxocariasis infection. Another 29% stated that they discussed
the risks if the client brought up the subject.

One outcome of a 1976 National Conference on Dog and Cat Control,
along with the efforts of the World Health Organization, was the formu-
lation of general recommendations to control dog- and cat-borne zoonoses.
Animal Welfare Council procedures. The castration of calves generally
is performed for cosmetic reasons and the hot-iron branding of cattle.

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no value, a court could rule against this
kind of a challenge. In cases where one
could not argue against the destruction
of an animal that is regarded as having no
economic value, one could appeal to the
public policy against the capricious
destruction of estate property. The kill-
ing of a companion animal may be con-
sidered capricious if alternatives such as
adoption exist. A court could nevertheless uphold a provision to destroy the
pet on the grounds that it is not caprici-
ous to euthanize an animal if the in-
tent is to ensure that it will not starve as
a stray or be subject to painful experi-
mentation.

Second, the various state laws that
protect animals from cruelty, neglect,
abandonment and destruction may be
considered applicable to the case at
hand. In Smith vs. Avanzino, the court
reasoned that although Sido was not
abandoned, the dog should still be en-
titled to the same protection afforded
an abandoned animal in California, i.e.,
a 10-day grace period before it can be
killed, during which time efforts are
made to place the animal. However,
a court could reason just as easily that
because an animal is not, in fact, aban-
donned (it is mentioned in a will), it is not
a proper subject for statutory protection.

The third and most common method
used to invalidate willed provisions for
euthanasia of pets is demonstration to
the court that the provision does not
represent the true intent of the deceased owner. This may involve either reinterpreting the will to show that the provisions made out of the desire to protect the pet from the pain and suffering that could result from abandonment, or by convincing the court that the owner been aware of alternatives, e.g., placement in a private home or adoption by an animal welfare agency, he or she would have wanted that course of action taken. The court could argue, however, that despite the existence of alternatives, the owner did not intend the animal to live.

As reflected above, an animal in Sido’s position is in a precarious situation, its fate subject to varying interpretations of ambiguous laws. Carisale calls for specific legislation to serve directly in disputes that arise in such cases. Such legislation would invalidate provisions indicating automatic euthanasia and replace them with conditional provisions, which would request euthanasia only after attempts at placement fail. For the time being, however, the veterinarian, without the guidance of a professional code of practice on the euthanasia of healthy animals, remains caught in the middle, ethically if not legally.

(Sido, a high-strung, demanding dog whose owner had wanted him euthanized because she felt that he would be unable to adjust to a new owner, was adopted by Richard Avanzino, president of the San Francisco SPCA.)

**Dutch figures on Animal Experiments**

At an informal meeting of scientists and animal welfare advocates in Utrecht on 10 September 1981, Dr. H. Rozemond of the Dutch Veterinary Inspection Service reported on the use of animals in laboratories in the Netherlands for 1980. The total experimental use was 1,486,639 animals, with mice (56.7%) and rats (24.3%) accounting for 80% of this figure. The number of animals used in 1980 has declined by 12% in comparison with 1979 although it is not clear whether this is due to economic constraints or to an active commitment by researchers to reduce their use of laboratory animals.

The breakdown of purposes for which animals were used is as follows: production and testing of biologicals, 17.5%; toxicology and pharmacology, 35.5%; diagnosis and similar activities, 6.9%; instruction and training, 0.8% and other research, 39.3%. In toxicology and pharmacology, most of the animals were used in the discovery and testing of medicines. Toxicity testing accounted for 7.8% of the national demand for laboratory animals, with acute tests accounting for over two thirds of this demand.

The Dutch authorities request information from researchers on the degree of discomfort to which the animals are or are likely to be exposed. They acknowledged that it is sometimes difficult to assess discomfort in animals, but consider the information useful in that it raises the awareness of researchers and by extension, of the public. The information compiled for 1980 broke down as follows: no appreciable discomfort, 37.8%; experiments performed under anesthesia, 10.7%; experiments with risk of appreciable discomfort, 41.4% and any other discomfort (multiple effects), 10.1%.

**UK Animal Experiments — 1980**

For the fourth consecutive year, the number of animal experiments performed annually in Great Britain has declined (see Table 1). Some sectors of the research and testing community have reduced their use of animals more than others (see Table 2). The sector labelled as “other non-profit groups” probably includes Wellcome Laboratories, one of the major pharmaceutical and vaccine manufacturers in Britain. However, they turn over their profits to the Wellcome Foundation and thus qualify as a non-profit group. The government sector includes hospitals but not medical schools.

When one looks at some of the specific research areas, some intriguing patterns emerge. Animal research on tobacco products has fallen from 15,200 experiments in 1977 to 1,900 in 1980. Cosmetics research has increased from 24,600 to 31,300 experiments over the same period but application of substances to the eye has fallen from 31,400 to 22,800. Animal research on burning or scalding has fallen from 6,600 to 1,900 experiments and infliction of other physical trauma from 17,100 to 3,000. It is, of course, impossible to tell from the figures alone whether some of these changes are due to increased activity by antivivisection groups. Another interesting statistic concerns the number of animal experiments conducted for carcinogenicity testing. From 1977 to 1980 the number varied from 62,600 to 51,500 to 58,500 to 39,900. This may indicate a downward trend which, in turn, may be the result of an increased availability of in vitro techniques for carcinogenicity screening.

It has been argued that the demands of new legislation, such as the Health and Safety at Work Act, 1974 in Britain, will increase the number of animals used. To date, this prediction has not been realized (see Table 3).

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An Overview of Zoo Goals and Exhibition Principles
Randall L. Eaton

Zoo Goals: An Overview

Recreation
The term recreation is best considered as re-creation or rejuvenation of the individual owing to a certain quality of experience. For many reasons, humans are attracted to nonhuman animals. Yearly, more than 100 million Americans visit zoos, a level surpassing visitation to professional athletic events or participation in fishing. Perhaps most astonishing about human fascination for wildlife in captivity is that it is so rampant despite the poor conditions of most zoos. More then anything this indicates an overwhelming affection for animal life.

There are possibly as many people who abhor zoos as who love them. Zoo haters are disgusted over the poor zoo conditions as indicated by neurotic behavior and boredom of animals in general. Also, there exists a widespread attitude that wild animals should not be confined. However, zoos are undergoing a revolution that is providing better physical and social environments for animals. The zoo revolution is eradicating boredom and psychopathology by inducing natural behavior and higher activity levels from animals. In turn, such improvements are elevating the recreational quality of the zoo for visitors. As the zoo revolution continues, more and more people are apt to visit zoos and find them both entertaining and rejuvenating. As more zoos follow the lead of Seattle, Washington’s Woodland Park, for example, which is replacing small and boring cages with expansive exhibits offering naturalistic features conducive to interesting behavior (See (3):170-177; 1980), perhaps even the zoo haters will be coming.

It is not uncommon among progressive-minded zoo professionals these days to hear disdain for the function of zoos as recreational. This attitude is understandable in that traditionally, zoos have done little but offer amusement along with parklands or picnic facilities. The progressive zoo person sets his or her goals above the old-fashioned recipe of crowding as many exotic animals as possible into an amusement-oriented menagerie to an authentic theme for exhibition intended to educate the public, offer research possibilities, and preserve and propagate species. Nevertheless, recreation remains a primary function of zoos. Most zoo visitors do not seek education in the everyday sense of information transfer. Even the best interpretive efforts attract but a minority of zoo visitors: Most people come to zoos to see animals. We should remember that this experience in itself is worthy and that for many people it has redeeming value.

In the final analysis, most zoo visitors find solace, pleasure, comfort, refuge and esthetic appreciation by experiencing wild animals in proximity. These intangible values, essentially spiritual, go far toward enlightening issues, soothing and promoting a positive attitude of kinship with all life. Perhaps these recreational functions achieve more than is hoped for from educational programs per se. In any event, the recreational qualities of a zoo contribute to its education, research and conservation goals. The better a zoo is for its animals, the more appealing it is to...
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Education

A formula for education is: education = entertainment + information. Because animals are intrinsically attractive to people, the element of entertainment is given to zoos. As stated above, the entertaining quality of animals is in itself educational in that it expands the heart, mind, and spirit, and generates awareness, affection and concern for nonhuman life and its needs. For many segments of society, however, information is valuable and sought after. The zoo can be an exemplary learning/teaching center of the community.

The primary learning/teaching resource of the zoo is its animals, especially their behavior. The zoo reaches its zenith of service when it presents animals that entertain and inform by their behavior, habits and activities, in contrast to the museum, which serves by displaying the variety, forms and physical adaptations of organisms. Educational objectives depend in large part on exhibition of animals in settings and social groupings that promote attractive, natural behavior. Beyond this, the levels of information and interpretation need to be designed for the levels and goals of various individuals and groups.

The general theme of interpretation available to all zoo visitors will strive to relate information to the immediate exhibit itself by emphasizing what is directly observable. Progressive zoo interpretation will focus on behavior patterns and gestures that are most readily observed, and relate these to social organization, communication systems and behavioral and ecological adaptation in general. The traditional interpretive theme of zoos, which lists details about scientific nomenclature, geographic distribution and foods consumed in the wild, attracts much less interest precisely because it does not relate to the immediate experience of living animals on exhibition. These distal aspects of biology are best left to museums and advanced learners.

Special programs are required for advanced learners ranging from lay naturalists to university students. These can encompass anything from special tours to various manuals for self-guided tours, classroom use or research libraries. Films and tapes can be produced for general and special audiences. For area schools, colleges and universities, curricula need to be developed. The progressive zoo represents an ideal setting for instruction in zoology, natural history, functional anatomy, animal behavior, and wildlife biology and conservation. Graduate and professional training can be made available in environmental design, zoo animal behavior, wild animal medicine and so on.

It is the responsibility of the zoo to make known its serious intention to cooperate with natural history groups, schools, colleges and universities. Progressive zoo management should promote and develop such programs, not only to serve the community, but also to benefit the zoo. For example, with the recent acceleration of zoo animal behavior as a scientific field, many zoos have gleaned insights from university students and faculties into the care, management, exhibition, and breeding of animals, not to mention enhanced interpretive programs, publicity and community relations. The growth of scientific interest in zoos and their use as

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Comment

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university training centers is proving to be of primary benefit to zoos and to society at large; as zoos progress, this trend should grow stronger.

Research

Since the early 1970s, the attraction of scientists to zoos has been immense. The scientific potential of zoos, coupled with diminishing opportunities for field research and support, has encouraged the infusion of science into zoos. The marriage of science with zoos contributes to the improvement of all zoo services, at virtually no cost to zoos, and thus should be promoted and encouraged as much as possible.

The scientific study of wild animals in captivity is crucial to the wise management of zoo animals, e.g., exhibition, interpretation, behavioral requirements, propagation, preventive medicine, health and husbandry. On a large scale, zoo research is advancing the preservation of endangered species through propagation in captivity, provision of animals for reintroduction into nature and indication of behavioral and ecological adaptations valuable to preservation of wild populations.

An additional role of zoo research is the development of techniques for studying feral populations. Zoos have been used to develop restraint techniques and to test the suitability of techniques for marking and radio-tracking as well as population indices (e.g., pellet counts of cervids).

Basic science in zoos is contributing to the refinement of behavioral and genetic theory applicable to both nonhuman and human animals. With proper records, zoos offer a unique source of data for testing ideas about social behavior, kinship and lineages are known. Such basic research also applies to zoo management, as in breeding programs and exhibition of social groups. In summary, zoo science is advancing zoology, psychology, ecology, genetics, physiology, wildlife biology, conservation and veterinary science.

There is a tendency of some people to respond to the words research and science as though these necessarily implied the killing or vivisection of animals. No animals are intentionally sacrificed in zoo research; moreover, the zoo's value to science comes from providing access to observation and harmless inspection of animals.

Animals die in sufficient numbers, even in the finest zoos, to supply specimens for physiological research and for zoological collections of museums which employ such specimens in research and exhibition. No zoo with progressive management should find it difficult to invite productive scientific involvement, as most zoos are close to one or more college or university.

There is one point of caution, however; in the recent history of zoo science, too many projects have been completed without provision of reports or publications to the cooperating zoo. As basic guidelines, the zoo should carefully screen all proposals; maintain final authority over all conduct and activities of investigators in the zoo; permit only those researchers that conform with basic zoo practices, policies and objectives; and require via contract submission of copies of all reports and publications from the project. Due acknowledgements to the zoo and assisting zoo staff could also be required.

A final point on zoo research concerns the regular keeping and maintenance of complete and accurate records. Especially significant to zoo research—and equally important to zoo management—are records over the long haul—records on the origin, history, health, treatment, exhibition and so on of animals, whether acquired from another zoo, from the wild, or born in the zoo.
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Special programs are required for advanced learners ranging from lay naturalists to university students. These can encompass anything from special tours to various manuals for self-guided tours, classroom use or research libraries. Films and tapes can be produced for general and special audiences. For area schools, colleges and universities, curricula need to be developed. The progressive zoo represents an ideal setting for instruction in zoology, natural history, functional anatomy, animal behavior, and wildlife biology and conservation. Graduate and professional training can be made available in environmental design, zoo animal behavior, wild animal medicine and so on.

It is the responsibility of the zoo to make known its serious intention to cooperate with natural history groups, schools, colleges and universities. Progressive zoo management should promote and develop such programs, not only to serve the community, but also to benefit the zoo. For example, with the recent acceleration of zoo animal behavior as a scientific field, many zoos have gleaned insights from university students and faculties into the care, management, exhibition, and breeding of animals, not to mention enhanced interpretive programs, publicity and community relations. The growth of scientific interest in zoos and their use as university training centers is proving to be of primary benefit to zoos and to society at large; as zoos progress, this trend should grow stronger.

**Research**

Since the early 1970s, the attraction of scientists to zoos has been immense. The scientific potential of zoos, coupled with diminishing opportunities for field research and support, has encouraged the infusion of science into zoos. The marriage of science with zoos contributes to the improvement of all zoo services, at virtually no cost to zoos, and thus should be promoted and encouraged as much as possible.

The scientific study of wild animals in captivity is crucial to the wise management of zoo animals, e.g., exhibition, interpretation, behavioral requirements, propagation, preventive medicine, health and husbandry. On a large scale, zoo research is advancing the preservation of endangered species through propagation in captivity, provision of animals for reintroduction into nature and indication of behavioral and ecological adaptations valuable to preservation of wild populations.

An additional role of zoo research is the development of techniques for studying feral populations. Zoos have been used to develop restraint techniques and to test the suitability of techniques for marking and radio-tracking as well as population indices (e.g., pellet counts of cervids).

Basic science in zoos is contributing to the refinement of behavioral and genetic theory applicable to both nonhuman and human animals. With proper records, zoos offer a unique source of data for testing ideas about social behavior, kinship and lineages are known. Such basic research also applies to zoo management, as in breeding programs and exhibition of social groups. In summary, zoo science is advancing zoology, psychology, ecology, genetics, physiology, wildlife biology, conservation and veterinary science.

There is a tendency of some people to respond to the words research and science as though these necessarily implied the killing or vivisection of animals. No animals are intentionally sacrificed in zoo research; moreover, the zoo's value to science comes from providing access to observation and harmless inspection of animals.

Animals die in sufficient numbers, even in the finest zoos, to supply specimens for physiological research and for zoological collections of museums which employ such specimens in research and exhibition.

No zoo with progressive management should find it difficult to invite productive scientific involvement, as most zoos are close to one or more college or university. There is one point of caution, however; in the recent history of zoo science, too many projects have been completed without provision of reports or publications to the cooperating zoo. As basic guidelines, the zoo should carefully screen all proposals; maintain final authority over all conduct and activities of investigators in the zoo; permit only those researches that conform with basic zoo practices, policies and objectives; and require via contract submission of copies of all reports and publications from the project. Due acknowledgements to the zoo and assisting zoo staff could also be required.

A final point on zoo research concerns the regular keeping and maintenance of complete and accurate records. Especially significant to zoo research—and equally important to zoo management—is not to mention the long haul—records on the origin, history, health, treatment, exhibition and so on of animals, whether acquired from another zoo, from the wild, or born in the zoo.
Conservation

Recreation, education and research programs all contribute to conservation through increased appreciation of wild animals and their needs in nature, concern for endangered species, and the development of scientific and technological means by which to study or conserve wildlife in captivity and in nature. There is much reason to believe that zoos will become the last refuge for increasing numbers of species, extinct locally, regionally or altogether in nature, which have been reintroduced into the wild with success (and failure). Continuing research in zoos and between zoos and wildlife ecologists and conservationists probably will assist reintroduction programs in the future.

For legitimate reasons ranging from potential value as a resource to spiritual values and moral considerations, society seems firmly committed to the preservation of lifeforms. Species endangerment and extinction will increase as human pressures continue to eliminate and alter habitats worldwide; thus zoos will assume a more important function as major refuges for species' survival and perpetuation.

In some cases it may be deemed desirable to maintain certain endangered or difficult-to-breed species off of exhibit, though viewing could be possible remotely, e.g., by closed-circuit television. The zoo visitors would approve of any serious efforts to preserve species even if it meant nonexhibition.

To develop most effectively conservation programs in the zoo, cooperative arrangements need be established with pertinent agencies and groups, e.g., state fish & game departments, U.S. Fish & Wildlife Service, cooperating zoos, private conservation groups such as Audubon Society, National Wildlife Federation, International Union for Conservation of Nature and scientific specialists.

Exhibition: Philosophy & Principles

The essence of any zoo or animal park is exhibition of living animals. For the most part, exhibition is an undertaking in what Aldo Leopold described as "recreational engineering." The first and most fundamental goal of exhibition is the design of physical, biotic and social factors which will encourage the animals' natural behavior and healthy activity levels. Generally, when animals behave naturally, they are attractive and healthy.

As the basic aim of exhibition, naturalistic behavior also enhances potential for education, research and conservation.

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The Role and Responsibility of Zoos: An Animal Protection Viewpoint

John E. Cooper

Introduction

The aim of this paper is to look at zoological collections from the viewpoint of the animal and, in particular, to draw attention to areas where welfare considerations should be paramount. I do not intend to cover the capture and transportation of zoo animals although this is obviously of great importance and must be included in any overall consideration of the welfare of zoo animals. In this paper, however, I shall concentrate upon the care of the animal within the zoo environment.

From the outset I must make it clear that I am a believer in the value of zoos as scientific and educational establishments. Hediger (1950) emphasized this approach in his book Wild Animals in Captivity and went so far as to say: "It is not too much to claim that today the zoo is a cultural element of prime importance. Since the beginning of the scientific age in the sixteenth and seventeenth centuries it has decisively influenced the whole trend of world natural history."

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For legitimate reasons ranging from potential value as a resource to spiritual values and moral considerations, society seems firmly committed to the preservation of lifeforms. Species endangerment and extinction will increase as human pressures continue to eliminate and alter habitats worldwide; thus zoos will assume a more important function as major refuges for species' survival and perpetuation. In some cases it may be deemed desirable to maintain certain endangered or difficult-to-breed species off of exhibit, though viewing could be possible remotely, e.g., by closed-circuit television. The zoo visitors would approve of any serious efforts to preserve species even if it meant nonexhibition.

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The following considerations underlie the creation of a systematic exhibit with optimal potentials:

- How can the animals' natural behavior be induced?
- What will the exhibit communicate to visitors?

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it as "...a sort of Noah's Ark, complete with laboratories and classrooms." They, like other authors, attempted to dispel the myth that captivity, per se, is inhumane. It is now recognized that the free-living animal is far from free; rather it is severely restricted in its activities by such factors as territorial aggression, predation, and competition for food.

Street (1965) in his book *Animals in Captivity*, also listed "entertainment" as a function of zoos. This is more questionable—too often in the past animals in zoos have been objects of derision and teasing, but I personally can see some merit in children (and, often, adults) gaining pleasure from watching the antics of properly housed and well-managed animals.

Having explained my personal position regarding zoos, I must go on to say that I recognize that zoos are an example of exploitation of animals. In this respect they become excessive. This is easier said than done. Much depends upon the species of animals involved and the conditions under which it is kept. Some animals have a wide tolerance range while in others it is narrow. Animals born in captivity are not subjected to the rigors and stresses of capture and the onset, therefore, it is obvious that we cannot generally in the zoo environment. However, it should be noted that abuse we are subjecting the animals.

**Welfare**

The welfare of animals in zoos can be discussed under three headings: 1) wilful cruelty; 2) neglect; 3) suboptimum management. It is not always easy to distinguish these three, but they provide useful guidelines.

Wilful cruelty, as the term implies, means that there is intentional gross ill-treatment of animals, such as the "beating, kicking, over-riding, over-driving, overloading, torturing, infuriating or terrifying," listed so graphically in the Protection of Animals Act, 1911 in England and Wales. Such actions are to be condemned whenever they occur, and should lead to a prosecution under the relevant legislation. In many cases where a prosecution is possible, the courts have shown a desire to punish the offender. However, the courts have indicated that there are limits to their power, and that it is not always possible to secure a conviction.

Wilful cruelty is often easy to diagnose. It is usually possible to establish whether an animal has been subjected to wilful cruelty, and if so, to establish the identity of the offender. However, it is important to remember that wilful cruelty is not the only factor that can affect the welfare of an animal. Neglect and suboptimum management can also have a significant impact on the welfare of an animal.

Neglect is more difficult to assess. It implies a failure to carry out an essential or important task rather than deliberate cruelty. Often the cause is ignorance. Examples of neglect were given by the Universities Federation for Animal Welfare (UFAW) in its small survey of zoos in Britain in 1970-71. UFAW drew attention to such matters as deformed hooves and infected wounds. More severe examples, some bordering upon wilful cruelty, were discussed by Jordan and Ormrod (1978). Such neglect can also be countered by legal action, under the relevant welfare legislation, but prevention is better than cure and the best nonmedical preventive measure is probably the licensing and inspection of zoos (see later).

The third aspect of welfare, suboptimum management, is the most difficult to assess. The variation between species was mentioned earlier. When a lion may appear to thrive, and probably breed, in a small and barren enclosure, an okapi or dolphin is unlikely even to survive unless offered the best possible environment and subjected to the highest standards of management. In the case of the cold-blooded animals, such as reptiles, amphibians and fish, the ability to "acclimatize" to adverse conditions is virtually nonexistent, and these animals may show clinical signs of disease due to only slight differences in temperature or humidity. Affected animals refuse to feed, develop skin and mouth lesions and secondary infections and gradually deteriorate. This "maladaptation syndrome" has long been recognized and is, regrettably, still a common cause of death in zoological collections. It and certain other conditions can be diagnosed clinically, but many less extreme examples of suboptimum management are extremely difficult to identify. As a result, recognition of welfare problems can often pose great problems.

One hesitates before mentioning "stress," as this is a term which is rarely used correctly. In addition, the concept of stress is complex and cannot be discussed adequately in a few sentences. It was Selye (1936) who first described a syndrome associated with such "stressors" as fatigue, pain, excess heat or cold, infection, parasitism and trauma. He postulated that while an animal may be able to tolerate and cope physiologically with low levels of stressors, it is unable to do so indefinitely and at a certain point begins to show pathological changes, such as a depression of the white blood cells, changes in the lymphoid tissues and gastric ulceration. Finally the animal may reach a stage of exhaustion and adrenal collapse. The true role of "stress" in the zoo is still a matter for conjecture, but there seems little doubt that as with other species, zoo animals should be protected from undue exposure to stressors. It is probable that "maladaptation" and other syndromes in animals are a manifestation of stress, the stressor being an adverse environment. Some stressors can be counteracted, to a certain extent, by the use of vitamins, minerals, antibiotics and corticosteroids, but it is far preferable to reduce the stressor to a minimum. Unfortunately, however, it is not always possible to identify such stressors and it is here that more research is urgently needed.

It will be apparent that the problem of suboptimum management is difficult to tackle when so little may be known of the requirements of the species in question. In the last century it was considered a great achievement to have kept an animal alive in captivity; many, despite having survived capture and transportation, died within a few weeks or months of arrival. This may still be a feature with some of the rarer species, but more often the problem is not one of keeping the animal alive but of maintaining it in the best possible condition and, where possible, getting it to breed. The requirements for a species to breed are often more critical than the requirements for it to survive, and breeding can be considered an indicator of good
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management. In this respect there is less excuse nowadays for a zoo director to claim ignorance. He or she can benefit greatly from the experiences of others. Publications such as the *International Zoo Yearbook* have done much to ensure that successes (and failures) of zoos are documented and, as a result, a zoo can benefit from the experiences of another establishment thousands of miles away. The holding of meetings, on both a national and international level, has also helped to improve communications and has enabled zoo personnel to meet one another and to come into contact with representatives from such fields as veterinary science, genetics and animal husbandry. As a result, new methods can be adopted and liaison improved, for example, to ensure that isolated individuals of uncommon species are exchanged or brought together in order to encourage them to breed.

A recent trend, which should be welcomed and encouraged, is for new zoos to specialize in certain groups—for example, ruminants, cats or reptiles—and to direct their energies and resources toward these rather than trying to maintain the wide selection of animals that is a characteristic of the older establishments. With such specialization come experience and expertise which do much to ensure the well-being of the charges. Advantage can be taken of new techniques, some of them the result of work with laboratory and domestic species, such as methods of artificial insemination, incubation and, in the veterinary field, laparoscopy for the purposes of sexing and diagnosis of disease.

**Requirements**

It is quite impossible, in a paper of this length, to detail the requirements for the adequate care of animals in zoological collections. Instead I should like to list some important prerequisites which must be considered in the assessment of any such establishment. These are: 1) trained, experienced and conscientious staff; 2) adequate and satisfactory accommodation; 3) optimum diet; 4) high standards of hygiene and disease prevention; 5) veterinary attention; 6) access to literature and contact with colleagues/other collections.

These points can only be discussed briefly. The staff are of paramount importance and it is no exaggeration to say that the welfare of zoo animals depends largely upon their dedication. In addition to dedication, however, they must receive training, and it is encouraging to note the trend in many countries, including Britain, toward the provision of training facilities for zoo staff. From the welfare point of view it is particularly important that this should include the recognition of health and disease and the ability to appreciate and take prompt action over pain and discomfort.

Accommodation for zoo animals has improved enormously in the past few years. Gone are many of the old-fashioned cages which afforded no opportunity for normal behavioral patterns and which were often aesthetically unpleasant. Modern enclosures take into consideration the needs of the animal and may include vegetation, pools, rocks and simulated habitats. Bars are less often seen; instead there is extensive use of glass and strong mesh and, for the larger species, of moats and ditches. Special care is always taken to ensure that there are as few dangers as possible for the animals (protruding nails or screws, toxic paints or corners in which individuals may become trapped). Zoo architecture is now a specialized subject; as Hasley (1972) pointed out, “The design of enclosures must be based on thorough knowledge of the animals’ ecology and behavior, and obviously zoo biologist, veterinary surgeon and architect must work closely together.”

The dietary requirements of many species are also better understood, and there is no longer any excuse for such conditions as nutritional bone disease in monkeys and vitamin A deficiency in terrapins. A welcome development has been the interest of commercial food manufacturers in the production of zoo animal diets. Such products are not suitable for all species, but provide a balanced and palatable diet, usually of high nutritional and microbiological status, for many animals. Hygiene and disease prevention are of great importance wherever animals are kept in captivity. They are vital if disease is to be avoided in both animals and staff. Veterinary attention can be included under the same heading. Many zoological establishments have a full-time veterinary surgeon; at others use is made of a local interest in zoo animals; 1976 marked the appearance in the English language (Fowler, 1978). There can be no doubt that the provision of adequate veterinary services for a zoo is of great importance if unnecessary pain and discomfort are to be avoided.

Access to literature, colleagues and other zoos is essential if the director and staff are not to become isolated. The enormous increase in such communications was mentioned earlier and attention should again be drawn to the *International Zoo Yearbook*, which contains a wealth of information. There should be no excuse for lack of contact.

One is loath to recommend the introduction of yet more legislation. However, it is increasingly apparent that zoos must be covered by statute; tighter control is in effect. In Britain, for example, there is legislation concerning pet shops, dangerous wild animals kept as pets, riding establishments and dog breeding laws relating to other animals; for example, a zoo may keep dangerous species, such as poisonous snakes and big cats, without a license. A “zoo” is loosely defined, yet in a country which prides itself on its concern for animal welfare. A similar situation applies in many other countries. There can be no doubt that statutory control over the establishment and maintenance of zoos, preferably coupled with registration and inspection (see later), is a vital step in helping to safeguard the welfare of their inmates. In some cases international legislation may be possible—an example is the European Economic Community (EEC), which is already looking at other aspects of animal welfare—and such standardization will be an important step forward. (Ed. Parliament.)
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The criteria mentioned so far are fairly straightforward and are met by many zoological gardens in many countries of the world. But there are still appalling examples of old-fashioned zoos, operating under primitive conditions, with little apparent regard for the welfare of the animals. Such zoos are to be found in developed countries as well as developing ones. What can be done about this?

**Action**

In my opinion the following measures are desirable if the standard of zoos is to be raised and the welfare of their inmates improved: 1) national and international legislation; 2) registration and inspection; 3) closer liaison between zoos, animal welfare organizations and conservation bodies.

One is loath to recommend the introduction of yet more legislation. However, it is increasingly apparent that zoos must be covered by statute; tighter control is in order. Where there is little or no control, as in many countries there are only a few zoos, dangerous wild animals kept as pets, riding establishments and dog breeding laws relating to other animals; for example, a zoo may keep dangerous species, such as is not covered by its own legislation. Such a situation is reprehensible, particularly in countries which has such zoos.

One cannot but feel that the establishment and maintenance of zoos, preferably coupled with registration and inspection (see later), is a vital step in helping to safeguard the welfare of their inmates. In some cases international legislation may be possible—an example is the European Convention on Environmental Protection (EEC), which is already looking at other aspects of zoos. Legislation which would require licensing of zoos is now pending in the British Parliament.
Registration and inspection of zoos should go hand-in-hand with legislation. The latter is of little value, per se, if it only serves to provide a list of zoos with no reference to their facilities and care of animals. A national register of zoos is desirable and only those establishments that are of a high enough standard should be licensed. Subsequent inspections at, say, three year intervals should be carried out to ensure that standards are being maintained or improved; if this is not the case, the license should be withdrawn. In some countries such a registration system already works well. In Britain the only such schemes are voluntary and, inevitably, tend to attract the better zoos rather than those of less high standard. The zoos on the lists of the Federation of Zoological Gardens of Great Britain and Ireland, for example, are generally those that already have good facilities and where animal welfare is an important consideration, rather than the less sophisticated establishments that could benefit greatly from inspections and advice. The composition of the inspection team is a matter of opinion, but in the case of the Federation it includes a zoologist and a veterinary surgeon, both of whom are experienced in work with zoo animals.

The final point, closer liaison between zoos, animals welfare organizations and conservation bodies is not one that can be enforced. Rather it must develop as a result of improved communications. For too long zoos have been on the periphery of the animal world, running their affairs in their own way and having few contacts with those in other related fields. Much of the misunderstanding would be dispelled if zoos were to play a more active part in debate on animal care and conservation and if bodies concerned with the latter were to make a greater effort to involve zoo staff in their deliberations. ISPA's decision to hold a symposium in 1979 on the role and responsibility of zoological establishments was a useful step in this direction and a good example of ISPA's sound and pragmatic approach to animal welfare.

In this paper I have made it clear that I am a supporter of zoos and have no wish to attack or criticize them unnecessarily. However, there is no doubt that zoos can be a source of "suffering," that is, avoidable pain or discomfort, and as such must attract the attention of all those concerned with animal welfare. However, I feel strongly that our approach should be constructive. We must press for tighter legislation and for higher standards of animal care. We must give our support to research which will aid in our understanding of zoo animal behavior and assist in the recognition of pain or discomfort. Above all, we must help to educate those concerned with zoological establishments so that the welfare of the animals takes its rightful place.

References

A Response to Dr. Ian Dunbar

Graham Henderson

In his article, "A Strategy for Dog Owner Education," (21:13-15, 1981), Dr. Ian Dunbar reveals his masterplan: Pet owners are not, he claims, irresponsible, they are this: we must somehow contrive to have potential pet owners apply for a license before they may obtain their dog. At the same time as this initial application is made, the hopeful candidate would be issued with an information package, the contents of which he or she would be tested on at some indeterminate future date. Almost certainly would spark a further onslaught of "information" designed to eradicate the offending areas of ignorance. The opportunity to finance this program by exposing-hungry pet food industry, and the end result would be a humane society which had happily licensed the dogs.

On the surface these suggestions appear to offer a utopian solution to the nagging problem of what I, for one, still prefer to call irresponsible pet ownership. How practical grounds, I would caution against its implementation.

By way of background, it might be useful to outline the licensing policies of the society with which I am most familiar, The Toronto Humane Society, for I believe that this system has great potential.

The Toronto Humane Society has, in addition to its many other humane responsibilities, for years been the animal control agent for the Corporation of the City of Toronto. Under the terms of the relevant by-laws we not only operate a shelter, but administer the licensing program; it is a program which contains no proviso for "dog owner education."

Like any humane society which performs the function of licensing agent, we have the perennial problem of being regarded by dog owners as the "law." Many appear to resent our attempts to exact the license fee and, having paid their fees, are singularly unresponsive to further pleas, however desperate, for donations. The appalling rate of return from dog owners, whom one might ordinarily expect to be quite sympathetic to a humane society, occurs for a reason. Our dog owners, as a whole ambivalent in their attitude toward the extent of their "commitment" to us and are reluctant to support us in any other material way. Most people adopting animals from our shelter are even reluctant to obtain a free membership. Worse yet, there is a standard drama played out each summer by a distressing number of city residents who seem bent upon avoiding our licensing agents in an attempt to circumvent the necessity of fulfilling their legal responsibilities.

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obligation to tag their dog.

Given such fertile ground, I shudder to think what the response might be should The Toronto Humane Society attempt to spawn in it a program which would not only tax these people's wallets, but also their patience, time and intelligence.

The experience of our Society in administering an extensive licensing program in a major Canadian city leads me to believe that any attempt to implement a system today would be required to effectively combat this delinquency would be staggering.

If a dog owner's inadequate understanding of his or her pet, Dunbar, for the average pet owner's, the humane society can...
obligation to tag their dog. Given such fertile ground, I shudder to think what the response might be.

The Toronto Humane Society attempts to spawn in it a program which would not only tax these people’s wallets, but also their patience, time and intelligence. The experience of our Society in administering an extensive licensing program in a major Canadian city leads me to believe that any attempt to implement a system would lead ultimately to chaos. Even with our similar to that envisaged by Dunbar would be required to collect from more than 50% of educationally neutral system, we find it difficult to envisage how the bureaucracy disaster be avoided.

Dr. Dunbar speaks, moreover, of divorcing the SPCA from its role as “euthanist” (or as he more delicately puts it, “exterminator”). This is a suggestion of indeterminate merit. Inasmuch as we would like ideally to avoid euthanizing any animal at all, Dunbar strikes close to home. However, as gruesome as the task may seem to some reason, thinks that the humane society retain its role as “euthanist” wherever possible. I believe that at the humane society the animals may be there to be, it would seem to me, “exterminated,” not “euthanized.”

Instead of looking toward the development of a complex pre-purchase screening program, I think we must look elsewhere, but first we must get our terms straight. Dunbar has done little better than to blanket his proposal with a blanket of misspeaking. I believe has an excellent system, licenses dogs in the City of Toronto at a cost of almost 47% of the revenue gained; which leaves a modest return to say the least. This is achieved through the employment of three full-time staff year round, 5 part-time clerical staff in the winter and 6 part-time license inspectors during the summer. The cost of a contingent information and education program would be, in my opinion, unsupportable. Similarly, the administration of such a system would be preposterously complex, requiring test centers, computers to tabulate and issue results, massive mailings per applicant and, I would think, gangs of war-hardened veterans to protect the staff from the onslaughts of indignant, blood-thirsty citizens.

Dunbar, for his part, proposed a means by which the humane society can ease the financial burden of developing his strategy for dog-owning education. However, why the pet food industry (monied as it may be) should want to finance an educational program which will almost certainly antagonize the majority of dog owners is beyond me. He is being overly optimistic when he asserts that his strategy would “certainly generate them some good press” — at best his understanding of human nature and the media is radically different from mine.

My alternative to Dr. Dunbar’s system is certainly much more modest, for it only really could affect; at least at the outset, those people who would adopt from a subscribing humane society.

The Toronto Humane Society currently runs an adoption program which does involve a screening component. Those interested in adopting one of our animals must fill out a form (see below) which asks some extremely germane questions. Based on the applicants’ responses to these queries, and based also in part upon additional verbal questioning, the adoption attendant may either accept or reject the candidate. Large dogs, for example, will not be adopted out to apartment dwellers; dogs or cats may not be given to people who have previously lost a pet through a road accident (it would depend on the circumstances); homes where no one is in Canada at the very least. This is achieved through the employment of three full-time staff year round, 5 part-time clerical staff in the winter and 6 part-time license inspectors during the summer. The cost of a contingent information and education program would be, in my opinion, unsupportable. Similarly, the administration of such a system would be preposterously complex, requiring test centers, computers to tabulate and issue results, massive mailings per applicant and, I would think, gangs of war-hardened veterans to protect the staff from the onslaughts of indignant, blood-thirsty citizens.

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welcome comments from those who know better. However, for the most part, it
functions and does enable us to screen out those individuals who would make poor
owners. Furthermore, it affords our staff the opportunity to inform the adopter of
the principles of good pet ownership. I might also add that many of the rejected
candidates become violently incensed, and I am basing my critique of Dunbar's test
system in part on this knowledge.

Not everyone, of course, obtains their dog from a humane society, and here
one encounters a problem. Breeders might, however, be persuaded to hand out
material to prospective owners, but pet stores and private transactions represent a
problem. I have no idea how one could prevent private individuals from giving away
or selling dogs. Dunbar, if he holds to his proposal, would have to call for a system of
retroactive testing, which would create even more inducement for owners who
do not have licenses for their dogs to dodge the authorities. This, of course, would
be unacceptable.

It might be possible for a central licensing system to be set up. Every agency
that sold animals to the public could be required to be a member and would act as
a licensing agent. Each time a pet was sold, the buyer would have to fill out a license
application form which would then be mailed to a central processing center for
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or in person. Failure to remit the fee could then, under suitable by-laws, result in a
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The foregoing does not, unfortunately, effectively address the issue of dog
owner education head-on. It only offers a stop-gap means of preventing certain peo-
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G. Henderson

Toronto Humane Society Dog Adoption Questionnaire

1. Are you interested in adopting a dog for yourself, a member of your immediate family, someone
   else?
2. Are you 18 or over? If yes, do you live with your parents?
3. Where do you live? (house, apartment) Do you rent?
4. If you live in an apartment, on what floor? Do you have the landlord's permission?
5. Please check any of the following reasons for wishing to adopt: hunting dog, breeding, watchdog,
   companion, playmate for a child, guard dog for business or property, family pet, other (please
   explain).
6. If you have any children, please list ages.
7. Do you have any other animals at present?
8. If yes, Cat? Dog? Other?
9. If you have another dog, has it received its annual shots?
10. Is there someone at home during the day who will train the dog?
11. Have you had experience in housebreaking a dog?
12. Have you ever adopted an animal from us before?
13. Have you ever had a dog before?
14. If yes, what became of it?
15. Do you believe in spaying? Neutering?
16. Will the dog be kept in the home? Yard? Tied up?
17. Do you have a fenced-in yard?
18. What do you intend to do with your dog when you go on vacation?
19. Did the animals you owned in the past see a veterinarian regularly?
20. What is the name of your previous veterinarian, if any?
21. Are you willing to go to the expense and trouble of taking your dog to a veterinarian for full
   preventative and medical care?
22. Do you agree to have your female spayed? Neutered?
23. Is any member of your family allergic to dogs?
24. Have you had a dog that had distemper or died from unknown causes within the last three months?
25. Are you a member of the Toronto Humane Society? If not, would you wish to join?

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People at Zoos: A Sociological Approach

Edward G. Ludwig

This is a participant observation study of animal/human relationships at zoos. Both zoo personnel and zoo visitors were observed intensively over a period of four months and less intensively for two years. While young these attitudes were often frustrated by the day to day routines of the job involving hosing and feeding, and the realities of limitations placed upon zoos by strained budgets and antiquated buildings. The public tended to be an additional source of frustration due to their apparent lack of sensitivity and desire to be amused rather than educated.

Methods

Zoos are but one context within which humans relate to animals. This study deals with that context alone and is based primarily on the observations that I made at a medium-sized zoo. Observations began during the spring of 1978 and continued over a period of two years. I continue to serve as a zoo volunteer, but have ceased taking precise notes. I have visited many other zoos of varying types and sizes since this study began, but observations of them were much briefer and less structured.

At the outset I formally joined the docent organization operating at the zoo chosen for detailed study. This is a group of public-spirited volunteers who donate their time for the benefit of the zoo and the zoo public. I completed the ten week course for new docents and qualified to serve as a guide for groups of people, mostly school children, visiting the zoo. Approximately 40 such tours of approximately one and one-half hour length were conducted, most during the late spring and summer of 1978. About thirty additional hours were spent posing as a regular zoo visitor for direct observation of the public. Permission was also received from the zoo director to spend the working day with the zoo employees. Contact of this nature was made with twenty of the sixty-six employees involved with animals including keepers, curators, the veterinary staff, and the director. Most encounters lasted between one and three hours, while some were carried over several days. Over eighty hours were spent directly with zoo employees.

No actual notes were taken while conducting the zoo tours, while observing the public or while working along with the zoo employees. Lunch hours were taken in my car at which time field notes were compiled for later use. Similar recordings were made at the end of the day.

With the exception of the zoo director, none of the employees I accompanied on the job were formally interviewed. Information was gained from general conversation throughout the day after I had been introduced as a college professor interested in zoos. These conversations were carried on as I tagged along on their rounds, sometimes helping them lug hay, pull a hose, and the like. Most were very eager to discuss what the job was like, how they felt about zoos, what animals were giving them trouble, and generally to teach me the ropes. The questions which follow are not totally accurate but are taken from my notes recorded from memory. It was my conviction that any actual notetaking during conversations would have seriously damaged the rapport which I was able to establish.

The first part of this paper will deal with impressions reached from conversations and interaction with the zoo employees. The second part will be based on the experiences with the school children and observations of the general public. The third part will deal more generally with the zoo context itself.

Zoo Employees

Value orientations

One of my primary interests was to determine the particular value orientations of zoo employees with respect to animals. For this purpose, I utilized the typology created by Dr. Stephen Kellert in his studies of attitudes toward animals (Kellert, 1976, 1980). (See Table 1).

Efforts were made to place expressions of attitudes elicited in conversations with the employees into Kellert's categories, but this proved difficult due to problems of overlapping. It was even more difficult to assign any particular employee to one or another category with a few exceptions. Contrary to expectations, one employee did appear to be predominantly negativistic, yet he had worked at the zoo as a keeper for many years. There is some question, however, whether his deprecating of the animals expressed so much his desire to avoid animals as a general desire to avoid work. He referred to the elephants as "the biggest asses in the place." Another employee appeared to fit rather well in the dominionistic category. He enjoyed talking about techniques for moving or capturing animals and his overall principle was that "you can't trust the bitches."

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Dr. Ludwig is Professor of Sociology at State University College, Fredonia, New York 14063. This is the edited version of a paper originally presented at the annual meeting of the Eastern Sociological Society, New York, NY, 16-18 March 1979.
People at Zoos: A Sociological Approach

Edward G. Ludwig

This is a participant observation study of animal/human relationships at zoos. Both zoo personnel and zoo visitors were observed intensively over a period of four months and less intensively for two years. While young these attitudes were often frustrated by the day to day routines of the job involving hosing and feeding, and the realities of limitations placed upon zoos by strained budgets and antiquated buildings. The public tended naturalistic, ecologistic and scientistic in their value orientation toward animals, hosing and feeding, and the realities of limitations placed upon zoos by strained routines.

Methods

Zoos are but one context within which humans relate to animals. This study deals with that context alone and is based primarily on the observations that I made at one medium-sized zoo. Observations began during the spring of 1978 and continued over a period of two years. I continue to serve as a zoo volunteer, but have ceased taking precise notes. I have visited many other zoos of varying types and sizes since this study began, but observations of them were much briefer and less structured.

At the outset I formally joined the docent organization operating at the zoo chosen for detailed study. This is a group of public-spirited volunteers who donate their time for the benefit of the zoo and the zoo public. I completed the ten week course for new docents and qualified to serve as a guide for groups of people, mostly school children, visiting the zoo. Approximately 40 such tours of approximately one and one-half hour length were conducted, most during the late spring and summer of 1978. About thirty additional hours were spent posing as a regular zoo visitor for direct observation of the public. Permission was also received from the zoo director to spend the working day with the zoo employees. Contact of this nature was made with twenty of the twenty-six employees involved with animals including keepers, curators, the veterinary staff, and the director. Most encounters lasted between one and three hours, while some were carried over several days. Over eighty hours were spent directly with zoo employees.

No actual notes were taken while conducting the zoo tours, while observing the public or while working along with the zoo employees. Lunch hours were taken in my car at which time field notes were compiled for later use. Similar recordings were made at the end of the day.

With the exception of the zoo director, none of the employees I accompanied on the job were formally interviewed. Information was gained from general conversation throughout the day after I had been introduced as a college professor interested in zoos. These conversations were carried on as I tagged along on their rounds, sometimes helping them lug hay, pull a hose, and the like. Most were very eager to discuss what the job was like, how they felt about zoos, what animals were giving them trouble, and generally to teach me the ropes. The quotes which follow are not totally accurate but are taken from my notes recorded from memory. It was my conviction that any actual notetaking during conversations would have seriously damaged the rapport which I was able to establish.

The first part of this paper will deal with impressions reached from conversations and interaction with the zoo employees. The second part will be based on the experiences with the school children and observations of the general public. The third part will deal more generally with the zoo context itself.

Zoo Employees

Value orientations

One of my primary interests was to determine the particular value orientations of zoo employees with respect to animals. For this purpose, I utilized the typology created by Dr. Stephen Kellert in his studies of attitudes toward animals (Kellert, 1976, 1980). (See Table 1).

Efforts were made to place expressions of attitudes elicited in conversations with the employees into Kellert's categories, but this proved difficult due to problems of overlapping. It was even more difficult to assign any particular employee to one or another category with a few exceptions. Contrary to expectations, one employee did appear to be predominantly negativistic, yet he had worked at the zoo as a keeper for many years. There is some question, however, whether his depreciating of the animals expressed so much his desire to avoid animals as a general desire to avoid work. He referred to the elephants as "the biggest ass in the place."

Another employee appeared to fit rather well in the dominionistic category. He enjoyed talking about techniques for moving or capturing animals and his overall principle was that "you can't trust the bitches."

### TABLE 1 - Attitudes Toward Animals

<table>
<thead>
<tr>
<th>Naturalistic</th>
<th>Ecologic</th>
<th>Humanistic</th>
<th>Moralistic</th>
<th>Scientific</th>
<th>Aesthetic</th>
<th>Utilitarian</th>
<th>Dominionistic</th>
<th>Negativistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest and affection for wildlife and the outdoors</td>
<td>Concern with the environment as a system, with wildlife species and with natural habitats</td>
<td>Interest and affection for individual animals, principally pets</td>
<td>Concern about the right and wrong treatment of animals, principally pets</td>
<td>Curiosity about the physical attributes and functioning of animals</td>
<td>Interest in the artistic and symbolic characteristics of animals</td>
<td>Concern with the practical and material value of animals</td>
<td>Concern with mastering and controlling animals</td>
<td>Interest in avoiding animals, due to indifference, fear, dislike or superstition</td>
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Dr. Ludwig is Professor of Sociology at State University College, Fredonia, New York 14063. This is the edited version of a paper originally presented at the annual meeting of the Eastern Sociological Society, New York, NY, 16-18 March 1979.
While many employees expressed affection for animals they had come to know and worked with over a period of time, only two appeared to be truly humanistic from the standpoint of their disapproval of putting sick animals away and the desire of one to nurse a paralyzed rodent for which there was no hope. The curators fit rather well in the scientistic category in their concern for knowledge about breeding, illnesses and behavior problems but this was coupled with strong ecologistic sentiments. One expressed the desire not to have to open the gates to the public every morning, wishing instead that he could “close ‘em for good.” No one exhibited strong aesthetic sentiments except in the context of naturalistic ones.

Value conflicts

It seemed logical to expect that zoo people in general would tend to be strongly naturalistic, ecologistic and scientistic. Our expectations were only partially borne out. Whatever the person’s orientation prior to employment at the zoo, the fact of employment creates a set of conflicts and contradictions in values in most employees which appear to be inherent in the very nature and function of zoos. It would appear that most of the younger employees were initially attracted to the zoo because of their naturalistic and scientistic orientation to animals. This type of individual often has had at least some college training in biology, wildlife management, or related area. It very soon becomes apparent to them that the typical zoo at the present time, which depends almost entirely on public approval and visitor demand, can devote little of its efforts to scientistic advancement and wildlife preservation in any real sense. Moreover, the new employee soon discovers that most of his or her time is taken up with housekeeping duties—shoveling manure, hosing out cages, removing uneaten food, and so on. It is not that they resent this type of work. As one young keeper put it, “At least I am around the critters, and I like that.” But it does not seem to be balanced with any sense of satisfaction that their efforts have any value beyond the very brief amusement of a mostly unappreciative public. In short, they discover that zoos are for people, not for animals. This raises a series of nagging questions and self-doubts which they grapple with often on a recurrent basis:

1. Am I learning anything? Is my own knowledge advancing? Where do I go from here?
2. Is the body of knowledge about animals growing and advancing because of zoos? Because of this zoo?
3. Does the public learn anything of value from zoos?
4. How does the keeping of this animal in this cage, which at best is a poor representation of its natural environment, have any bearing on the issues of wildlife management and preservation?

The resolution of these issues is indeed a difficult one given the typical situation in most zoos of strained budgets, antiquated, obsolete buildings, and an apathetic educated public. A number of possible solutions is likely to cross these employees’ minds, such as returning to school or seeking another job related to animals, yet the most common response, certainly for those who remain, is to pin their hopes on the future, to perceive themselves as part of a larger picture in which they are able to help further the trend toward more science/conservation-oriented zoos through education and creation of public awareness. Their perceptions of the public, however, do little to feed that hope. The keeper who views the public each day develops a general impression that the public has only a mild interest in the animals. The general deportment of visitors suggests that they want to be amused rather than educated, and their attention span with respect to any one animal is greatly limited. Reference to the public by zoo employees vary from “They’re here for a good time, that’s all.” to “They couldn’t care less.” Some of those who hope for the future are dimmed by what they perceive to be an unappreciative public appear to personalize their relationship with the animals and express in Kellett’s terminology a much more humanistic and moralistic orientation. They may go so far as to reject the moral legitimacy of zoos but remain “for the sake of the animals.” This is similar to the behavior of employees who remain in other types of institutions whose major purpose they question, such as nursing homes, prisons, and some special schools, on the basis that these institutions would be “that much worse” without their presence.

Clearly not all zoo employees are troubled by these value conflicts. Indeed, most of the older employees do not express these concerns. A few might be classified in Kellett’s terms as utilitarian. They are likely to place greater importance on the legitimacy of the recreation and amusement function of zoos. For example, one of the older employees expressed his displeasure with the more recent ban on feeding the animals: “People had a good time feeding the animals and more of them came.” These employees were more likely to find less fault with the antiquated aspects of the physical set-up except insofar as it made their jobs of controlling the animals more difficult.

The age-old conflict between educated youth and experienced older employees was very evident at the zoo under study. Older employees perceived younger ones to be much too idealistic, and some seemed bent on discouraging younger employees from doing anything beyond the routine tasks of hosing and feeding. Both older and younger employees believed their efforts had any value in some sort of mystique about communizing and dealing with animals. The older employees were likely to attribute it to years of experience. Younger employees were more likely to identify it as a frame of mind or an ability innate to some people. As one of them put it, “You have to be born with it. You have to have confidence and you have to like animals. But that’s not enough. Some people might like animals but they make animals nervous.” Most all employees are convinced that they have a “way” with animals as good or better than most everyone else, or at the least, the capacity to develop such a relationship.

We had suspected that different keepers would express a decided preference for one or more animals over others. Moreover, we suspected that there would be greater status associated with the care and responsibility of some animals than with other animals. There was little evidence to support either of our expectations. There did not appear to be any more or less prestige associated with working with elephants, for example, than that associated with working with birds or large cats.

Preference for certain animals over others was more likely to be based on such matters as whether the job was inside or outside, required more or less walking, was more or less demanding of one’s time, and the like. I suspect that this apparent lack of preference regarding animals per se stems primarily from the fact that regardless of the animals in one’s charge, the job is basically the same: shoveling, hosing, and general housekeeping with no real involvement in activities of an ecological nature.

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animals is overshadowed by a myriad of other considerations. The most dedicated animal caretaker revealed at least some ambivalence in his or her approach to animals. The interest in and affection for animals is seasoned by the perception of the animal as a threat: 1) the threat of physical harm, 2) the threat of escape and ultimate blame, 3) problems of control and maintenance of routine, 4) the dependence on the animal as the indirect source of income and job security. Coupling this with legitimate concerns over rate of pay, work schedule, chances of promotion, job security, and the like, it becomes obvious that the employees of the zoo experience the same kinds of frustrations and attacks upon self-esteem as employees in a host of other occupations. Their situation is not unlike the school teacher who finds that behavioral problems occupy more time than teaching, the nurse who spends more time in housekeeping or clerical duties than with patients, or the engineer who seldom gets to use advanced mathematics. The possible examples are endless. But the fact that zoo employees find themselves in a nonessential industry, indeed one that at budget time is sometimes thought by some to be expendable, makes these frustrations doubly difficult.

The Public

Observations made in both formal (guided tours) and informal settings suggest that the zoo employees’ perceptions of the public are fairly accurate. For most people, most animals are not interesting enough to command more than fleeting attention. Indeed, most animals are likely to be viewed in passing unless the animal does something to bring the spectator to a halt. People will usually stop, at least momentarily, for 1) animals that beg, 2) animals that are feeding, 3) baby animals, 4) animals that make sounds, or 5) animals that are mimicking human behavior. They will pay little or no attention to animals that are resting, sleeping, or hiding; in fact, they may well find such inactivity annoying. Irritation and annoyance are most likely to be the reactions to animals that eliminate or regurgitate and/or manifest stereotyped behavior such as incessant pacing. Elimination, regurgitation, odors, or exposure of genitals, aside from being annoying, can also be the source of humor and joking for visitors in groups. Any appreciation for the hooved animals seems to be offset by the discomfort they cause by virtue of their larger compounds and the additional walking this entails. Animals are likely to be referred to as cute, funny-looking, lazy, dirty, weird, strange. Only on occasion does one hear any such comments as, “My isn’t that a magnificent animal.” Such comments are most likely to be made of the giraffe or polar bear. The most common types of questions are: 1) What is that thing? 2) Why does the elephant have a hole in his ear? 3) Why does the lioness have a hole in her ear? 4) Why does the elephant have a hole in his ear? 5) Why does the gorilla throw up (followed by “Oh my God, he is eating it.”)? 5) Why isn’t the rhinoceros (the kangaroo, the camel) out? 6) Why is the reptile house closed?

For persons with a strong naturalistic orientation, such as some of the keepers (and in this respect, I must confess my own bias), it is easy to develop very strong negative feelings about the public. There is a strong feeling among a good number of zoo staff that many visitors demean the animals and rob them of the respect they deserve. Indeed, a group of people goading the elderly chimp into spitting against the glass and then squealing in delight over the animal’s actions, is not a very pretty picture. As one of the keepers put it, “It’s people like that, that turn this place into a zoo.”
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Yet most of the public are not this way. In fact, I suspect that the type just described is a decided minority. They happen to be the ones who are most vocal and visible. Most of the public do not reveal their feelings one way or the other. Hence, statements about them are little more than conjecture. Yet I received the decided impression that many of them, particularly adults without children, felt somewhat embarrassed by the whole affair. Those with children seem less so because in a sense the children give them reason for being there. This aura of embarrassment struck me as similar to that which people experience in the presence of a retarded child or disabled person. It reveals a confusion over what an appropriate response should be. This is something that is most likely to be made with animals that look back at the viewers and because of their size look particularly out of place in their (often cage-type) compounds. To carry my conjecture further, I suspect these people do not come back very often. When was your last trip to a zoo?

Guided tours of school children can be quite different, as the emphasis can be placed on education rather than simple amusement. The experience, however, can also be quite disillusioning for the docents when the school children are very likely to view the day as a day off from school. Docents, in general, appear to be highly naturalistic in their orientation. Their fondness for animals, much like that of the keepers, makes them more vulnerable to the insensitivities of the public. They come armed with interesting facts and anecdotes about the animals from special classes they have faithfully attended, only to find that they may be talking to themselves and cannot be heard above the babble of voices of children wanting to rush to the next stop, eat their lunch, or head for the special children's petting zoo. How successful guided tours can be as an educational experience depends on a considerable extent on the preparation in school prior to the event and on the adult supervision that accompanies the class. The recitation of facts and figures can be fatal in attempting to hold the attention of third and fourth graders. On the other hand, contrasting the behavior of animals in the wild as opposed to captivity, and discussing some of the problems in zoos, such as stereotyped behavior, human imprinting, and the like, can successfully hold their attention and create the atmosphere of respect for and understanding of animals that could make for a more intelligent public of the future.

The Zoo Context

The dictionary definition refers to a zoo as a collection of living animals usually for public display. Yet the word is most often used in a context that has no reference to animals whatsoever. Frequently it is used to refer to gatherings of people that are disorderly, chaotic and poorly organized. It is not uncommon for mental institutions, schools, and the like to be called zoos, and when zoo keepers refer to the primate house as being turned into a zoo, their reference is not to the animals but to the people. The most serious shortcoming that zoos must overcome is their history, which conjures up such an image and creates expectations which have long been obsolete. Yet for many of these expectations remain. People wish to see active animals, performing animals, roaming animals. They wish to see animals in their wild state but under "unwild" conditions. The fact is, of course, they cannot have it both ways, at least with respect to most animals. The armadillo remains, disappointingly, curled up in a ball because the floor of the cage is steel, and he cannot dig his way underground. The orangutan wears his feeding dish on his head, not to entertain his
public, but because he has nothing else to do. The gorilla regurgitates and eats his vomit, not because he lacks the decency and sense of a human, but probably because feeding in the wild is an all day affair.

Larger zoos and so-called safari parks have attempted to solve some of these problems, but there is no way to display animals in their wild state. The necessity of separating prey and predator, and the fact of artificial feeding, leave little more than illusion. The large herbivores are the easiest to accommodate in a natural state, but these lack the appeal of the so-called wilder animals. Ironically, the one event that comes closest to life in the wild, the feeding of snakes with live prey, often takes place behind locked doors so as not to offend the public.

Our purpose is not to discuss the ethics of keeping animals in a captive state, but rather to point up the dilemma that zoos must face, a dilemma which insures that many visitors to the zoo will leave far from satisfied by the experience. It might be that zoos could be most successful in carrying out their educational mission if they focused on the problem itself, if people were made aware of what the problem of captivity entails, and what that means in terms of wildlife management as civilization impinges more and more upon the diminishing natural areas of the world.

It could well be that certain animals should simply not be displayed in most zoos any longer. Perhaps the empty cage with explanation would be a much greater educational experience than the display of animals in an unnatural state. Perhaps children's zoos should be limited to domesticated animals, and the distinction between them and wild animals be made more apparent.

Perhaps there ought to be a growing emphasis on support of efforts in science and conservation as ends in themselves rather than the implied need to tie them in with amusement/recreation functions of zoos.

Summary

This is a highly impressionistic and in many ways subjective paper based upon rather vague observations of the human/animal relationship within the context of zoos. It has stressed the value conflicts and dilemmas that arise from the very nature of zoos. Most will agree that zoos can no longer justify themselves on the basis of the amusement function alone, yet neither the attitude of the public nor the set-up of most zoos permit them to be the educational institutions that more legitimately justify them.

Not long ago a sign was put up by some unknown person outside the gorilla cage at the zoo under study calling attention to the high level of intelligence among apes and questioning the adequacy of the facilities for such an intelligent animal. How much better an educational experience it might have been for the public if such a sign or perhaps one somewhat more appropriate had been placed there by the zoo itself.

References


Injuries to Birds of Prey Caught in Leghold Traps

Katherine Durham

173 birds of prey, including 32 Bald Eagles, have been treated for trapping injuries at the University of Minnesota Raptor Research and Rehabilitation Program since 1972. These were birds caught primarily in "open" bait leghold sets incidental to furbearer trapping in the Minnesota region. The differential outcome of the injuries with respect to crippling or mortality is presented for large versus small raptors, toe versus leg injuries, and fracture of the leg versus soft tissue damage only.

There is only limited potential for mitigating the effects of trapping injuries to raptors because of the irreversable soft tissue damage usually associated with such injuries, which results in the loss of the extremity. The extent of soft tissue damage usually cannot be determined at the time the bird is found, as the signs of necrosis require several days to develop. The inadvertent trapping of raptors should therefore be prevented by the restriction of open bait sets.

Raptor Research and Rehabilitation Program

From 1972 through 1980, 1,856 birds of prey (i.e., raptors: eagles, hawks, owls, and falcons) were presented for treatment to the Raptor Research and Rehabilitation Program within the College of Veterinary Medicine at the University of Minnesota (St. Paul) (Table 1). Most of the raptors were wild birds from Minnesota and neighboring states admitted for traumatic injuries, such as a fractured wing resulting from collision with powerlines or moving vehicles, or injuries from projectiles (Table 2). Approximately 35% of the raptors were successfully rehabilitated and returned to the wild, most of them having required intensive veterinary care and the provision of food and shelter over a period of a few months. Another 30% were birds that survived but could not be released; these have played a valuable role in breeding programs, nature exhibits, public education programs, and research (Table 4) (Redig and Duke, 1978).

Vulnerability of Raptors to Open Bait Ground Sets

As carnivorous birds, raptors are also opportunistic scavengers, especially during the winter months when inclement weather and migration through strange territories increase the difficulty of catching live prey. They are visually attracted to exposed carrion and thus can be inadvertently caught in leghold traps set for furbearers when exposed bait is placed in the immediate vicinity of the trap, the so-called "exposed" or "open" bait set (Robinson, 1961; Leopold, 1964; Cain et al., 1972; Beasom, 1974; Fuller et al., 1974; Cooper, 1977)

173 raptors have been admitted for trapping injuries since 1972 (representing about 9% of total admissions), including 32 Bald Eagles and 7 Golden Eagles (Table 3). After the use of pole traps (steel traps set on a post specifically for avian predators) in Minnesota was restricted in 1976 (Fig. 1), trapping injuries declined

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Our purpose is not to discuss the ethics of keeping animals in a captive state, but rather to point up the dilemma that zoos must face, a dilemma which insures that many visitors to the zoo will leave far from satisfied by the experience. It might be that zoos could be most successful in carrying out their educational mission if they focused on the problem itself, if people were made aware of what the problem of captivity entails, and what that means in terms of wildlife management as civilization impinges more and more upon the diminishing natural areas of the world.

It could well be that certain animals should simply not be displayed in most zoos any longer. Perhaps the empty cage with explanation would be a much greater learning experience than the display of animals in an unnatural state. Perhaps children's zoos should be limited to domesticated animals, and the distinction between them and wild animals be made more apparent.

Perhaps there ought to be a growing emphasis on support of efforts in science and conservation as ends in themselves rather than the implied need to tie them in with amusement/recreation functions of zoos.

Summary

This is a highly impressionistic and in many ways subjective paper based upon rather limited observations of the human/animal relationship within the context of zoos. It has stressed the value conflicts and dilemmas that arise from the very nature of zoos. Most will agree that zoos can no longer justify themselves on the basis of the amusement function alone, yet neither the attitude of the public nor the set-up of most zoos permit them to be the educational institutions that more legitimately justify them.

Not long ago a sign was put up by some unknown person outside the gorilla cage at the zoo under study calling attention to the high level of intelligence among apes and questioning the adequacy of the facilities for such an intelligent animal. How much better an educational experience it might have been for the public if such a sign or perhaps one somewhat more appropriate had been placed there by the zoo itself.

References


Injuries to Birds of Prey Caught in Leghold Traps

Katherine Durham

173 birds of prey, including 32 Bald Eagles, have been treated for trapping injuries at the University of Minnesota Raptor Research and Rehabilitation Program since 1972. These were birds caught primarily in "open" bait leghold sets incidental to furbearer trapping in the Minnesota region. The differential outcome of the injuries with respect to crippling or mortality is presented for large versus small raptors, toe versus leg injuries, and fracture of the leg versus soft tissue damage only.

There is only limited potential for mitigating the effects of trapping injuries to raptors because of the irreversible soft tissue damage usually associated with such injuries, which results in the loss of the extremity. The extent of soft tissue damage usually cannot be determined at the time the bird is found, as the signs of necrosis require several days to develop. The inadvertent trapping of raptors should therefore be prevented by the restriction of open bait sets.

Raptor Research and Rehabilitation Program

From 1972 through 1980, 1,856 birds of prey (i.e., raptors: eagles, hawks, owls, and falcons) were presented for treatment to the Raptor Research and Rehabilitation Program within the College of Veterinary Medicine at the University of Minnesota (St. Paul) (Table 1). Most of the raptors were wild birds from Minnesota and neighboring states admitted for traumatic injuries, such as a fractured wing resulting from collision with powerlines or moving vehicles, or injuries from projectiles (Table 2). Approximately 35% of the raptors were successfully rehabilitated and returned to the wild, most of them having required intensive veterinary care and the provision of food and shelter over a period of a few months. Another 30% were birds that survived but could not be released; these have played a valuable role in breeding programs, nature exhibits, public education programs, and research (Table 4) (Redig and Duke, 1978).

Vulnerability of Raptors to Open Bait Ground Sets

As carnivorous birds, raptors are also opportunistic scavengers, especially during the winter months when inclement weather and migration through strange territories increase the difficulty of catching live prey. They are visually attracted to exposed carrion and thus can be inadvertently caught in leghold traps set for furbearers when exposed bait is placed in the immediate vicinity of the trap, the so-called "exposed" or "open" bait set (Robinson, 1961; Leopold, 1964; Cain et al., 1972; Beasom, 1974; Fuller et al., 1974; Cooper, 1977).

173 raptors have been admitted for trapping injuries since 1972 (representing about 9% of total admissions), including 32 Bald Eagles and 7 Golden Eagles (Table 3). After the use of pole traps (steel traps set on a post specifically for avian predators) in Minnesota was restricted in 1976 (Fig. 1), trapping injuries declined...
Figure 1 Great Horned Owl suspended from a pole trap by one of its feet. Even if such a bird is found still alive, the soft tissue damage will invariably lead to loss of that portion of the limb distal to the injury.

from about 11-21% to about 4-9% of total annual admissions. The Great Horned Owl has shown the largest reduction since 1976 in percentage of admissions due to trapping injuries. Minnesota prohibited the placement of exposed carrion within 20 feet of a set starting with the 1980-81 season; trapping admissions should therefore continue to decline. However, raptors injured by traps are also received from other states, including Wisconsin, Michigan, and South Dakota, which do not have such a regulation.

A majority of the Bald Eagles received for trapping injuries have been adult birds (at least 4-5 years old), roughly in a proportion similar to the age structure of the Minnesota winter Bald Eagle population (James D. Fraser, pers. comm.). Thus, the Balds were apparently trapped randomly with respect to age, in contrast to the increased vulnerability of immature birds normally associated with injuries from projectiles and accidents (Newton, 1979). Further, admissions of Bald Eagles for trapping injuries have increased over the years, and it is now the species most commonly received in this injury category.

<table>
<thead>
<tr>
<th>TABLE 1. Species &amp; Numbers of Raptors Admitted (1972-1980)</th>
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</thead>
<tbody>
<tr>
<td>Species</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Red-tailed Hawk</td>
</tr>
<tr>
<td>Sharp-shinned Hawk</td>
</tr>
<tr>
<td>Great Horned Owl</td>
</tr>
<tr>
<td>Peregrine Falcon</td>
</tr>
<tr>
<td>Bald Eagle</td>
</tr>
<tr>
<td>Cooper's Hawk</td>
</tr>
<tr>
<td>Sharp-shinned Hawk</td>
</tr>
<tr>
<td>Northern Harrier</td>
</tr>
<tr>
<td>Common Screech Owl</td>
</tr>
<tr>
<td>Red-shouldered Hawk</td>
</tr>
<tr>
<td>Gyrfalcon</td>
</tr>
<tr>
<td>Rough-legged Hawk</td>
</tr>
<tr>
<td>Swainson's Hawk</td>
</tr>
<tr>
<td>Northern Goshawk</td>
</tr>
<tr>
<td>Turkey Vulture</td>
</tr>
<tr>
<td>Barred Owl</td>
</tr>
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<td>Ferruginous Hawk</td>
</tr>
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<td>Snowy Owl</td>
</tr>
<tr>
<td>Great Gray Owl</td>
</tr>
<tr>
<td>Golden Eagle</td>
</tr>
<tr>
<td>Merlin</td>
</tr>
<tr>
<td>Prairie Falcon</td>
</tr>
<tr>
<td>Harri’s Hawk</td>
</tr>
<tr>
<td>Long-eared Owl</td>
</tr>
<tr>
<td>Burrowing Owl</td>
</tr>
<tr>
<td>Saw-whet Owl</td>
</tr>
<tr>
<td>Boreal Owl</td>
</tr>
<tr>
<td>Osprey</td>
</tr>
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<td>TOTAL:</td>
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</table>

*Species admitted for trapping injuries

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<td>Cause</td>
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<tr>
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</tr>
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<td>Leghold Trap</td>
</tr>
<tr>
<td>Projectile</td>
</tr>
<tr>
<td>Accident</td>
</tr>
<tr>
<td>Orphan</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>TOTAL:</td>
</tr>
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</table>

**Difficulty of Assessing Severity of Trapping Injuries**

The leghold trap has been described as “unique among all predator control procedures because of its selectivity, enabling the capture of a specific target animal and the release of unwanted animals” (Bell, 1976). This is a common theme; namely, that selectivity is determined not so much by the capture of a low proportion of nontarget animals, but rather by the ability to release those animals “without serious injury.” Henderson’s and Boggess’ (1977) description of the Kansas Extension Service predator control program emphasized the need to promote “control methods which are as safe, efficient, economical, humane and selective as possible.” They stated that one of the key factors in such a program, to the extent that steel traps are employed, is to use offset-jawed traps so that many of the nontarget animals can be “released unharmed.”
Figure 1 Great Horned Owl suspended from a pole trap by one of its feet. Even if such a bird is found still alive, the soft tissue damage will invariably lead to loss of that portion of the limb distal to the injury.

from about 11.21% to about 4.9% of total annual admissions. The Great Horned Owl has shown the largest reduction since 1976 in percentage of admissions due to trapping injuries. Minnesota prohibited the placement of exposed carrion within 20 feet of a set starting with the 1980-81 season; trapping admissions should therefore continue to decline. However, raptors injured by traps are also received from other states, including Wisconsin, Michigan, and South Dakota, which do not have such a regulation.

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<tr>
<td>Red-tailed Hawk</td>
<td>335</td>
<td>Sharp-shinned Hawk</td>
<td>27</td>
</tr>
<tr>
<td>Great Horned Owl</td>
<td>302</td>
<td>Peregrine Falcon</td>
<td>24</td>
</tr>
<tr>
<td>American Kestrel</td>
<td>235</td>
<td>Cooper's Hawk</td>
<td>22</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td>159</td>
<td>Northern Harrier</td>
<td>18</td>
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<tr>
<td>Short-eared Owl</td>
<td>138</td>
<td>Northern Goshawk</td>
<td>17</td>
</tr>
<tr>
<td>Common Screech Owl</td>
<td>93</td>
<td>Red-shouldered Hawk</td>
<td>9</td>
</tr>
<tr>
<td>Barred Owl</td>
<td>84</td>
<td>Gyrfalcon</td>
<td>9</td>
</tr>
<tr>
<td>Rough-legged Hawk</td>
<td>71</td>
<td>Swainson's Hawk</td>
<td>9</td>
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<tr>
<td>Northern Goshawk</td>
<td>49</td>
<td>Turkey Vulture</td>
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<tr>
<td>Snowy Owl</td>
<td>47</td>
<td>Ferruginous Hawk</td>
<td>6</td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>39</td>
<td>Great Gray Owl</td>
<td>6</td>
</tr>
<tr>
<td>Prairine Falcon</td>
<td>37</td>
<td>Merlin</td>
<td>4</td>
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<tr>
<td>Long-eared Owl</td>
<td>36</td>
<td>Harris' Hawk</td>
<td>1</td>
</tr>
<tr>
<td>Saw-whet Owl</td>
<td>28</td>
<td>Burrowing Owl</td>
<td>1</td>
</tr>
<tr>
<td>Osprey</td>
<td>27</td>
<td>Boreal Owl</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong>: 1,856</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Species admitted for trapping injuries

### TABLE 2. Cause of Admission (1856 Raptors: 1972-1980)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leghold Trap</td>
<td>9.3%</td>
</tr>
<tr>
<td>Projectile</td>
<td>44.3%</td>
</tr>
<tr>
<td>Accident</td>
<td>10.7%</td>
</tr>
<tr>
<td>Orphan</td>
<td>17.3%</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### Difficulty of Assessing Severity of Trapping Injuries

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TABLE 3. Number of Raptors by Species Admitted for Trapping Injuries

(1972-1980) and Nature of Injury Upon Admission in Relation to Size of Raptor

<table>
<thead>
<tr>
<th>Species</th>
<th>Avg. Wt. (grams)</th>
<th># Admissions</th>
<th>Trapping Injuries as % of Total</th>
<th>Leg Injuries as % of Total</th>
<th>Fractures or Amputations as % of Leg</th>
<th>Died as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bald Eagle</td>
<td>4,000</td>
<td>32</td>
<td>20.1%</td>
<td>57%</td>
<td>26%</td>
<td>26%</td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>4,300</td>
<td>7</td>
<td>17.9</td>
<td>50%</td>
<td>33%</td>
<td>17.9</td>
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<tr>
<td>Snowy Owl</td>
<td>2,000</td>
<td>3</td>
<td>6.4</td>
<td>67%</td>
<td>50%</td>
<td>67%</td>
</tr>
<tr>
<td>Great Horned Owl</td>
<td>1,750</td>
<td>74</td>
<td>24.5</td>
<td>71%</td>
<td>35%</td>
<td>71%</td>
</tr>
<tr>
<td>Northern Goshawk</td>
<td>1,140</td>
<td>4</td>
<td>8.2</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Red-tailed Hawk</td>
<td>1,125</td>
<td>22</td>
<td>6.6</td>
<td>88%</td>
<td>73%</td>
<td>73%</td>
</tr>
<tr>
<td>Rough-legged Hawk</td>
<td>1,010</td>
<td>12</td>
<td>16.9</td>
<td>83%</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>Barred Owl</td>
<td>700</td>
<td>8</td>
<td>9.5</td>
<td>100%</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>Red-shouldered Owl</td>
<td>625</td>
<td>2</td>
<td>11.8</td>
<td>100%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Northern Harrier</td>
<td>520</td>
<td>1</td>
<td>5.6</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Broad-winged Hawk</td>
<td>455</td>
<td>1</td>
<td>0.7</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Short-eared Owl</td>
<td>375</td>
<td>1</td>
<td>4.2</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Screech Owl</td>
<td>215</td>
<td>6</td>
<td>6.5</td>
<td>100%</td>
<td>67%</td>
<td>67%</td>
</tr>
</tbody>
</table>

*Approximate average weights for diurnal species taken from Brown and Amadon (1960); nocturnal species from McKeever (1979).

**Trapping injuries are classified as either "toe injuries" or "leg injuries."

***Leg injuries are classified as involving either "fracture or amputation" or "soft tissue damage only."

****One of the seven injuries, a primary injury to a wing, is not accounted for by this figure.

TABLE 4. Outcome of Trapping Injuries

<table>
<thead>
<tr>
<th>Species</th>
<th>Released</th>
<th>Crippled</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Admissions</td>
<td>All Birds (1,089)</td>
<td>35.0</td>
<td>29.4</td>
</tr>
<tr>
<td>Eagles (131)</td>
<td>45.8</td>
<td>26.7</td>
<td>27.3</td>
</tr>
<tr>
<td>1972-1979</td>
<td>Non-Eagles (958)</td>
<td>33.5</td>
<td>29.7</td>
</tr>
<tr>
<td>Eagles (36)</td>
<td>33.3</td>
<td>19.5</td>
<td>47.2</td>
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<tr>
<td>Non-Eagles (94)</td>
<td>40.4</td>
<td>16.0</td>
<td>43.6</td>
</tr>
<tr>
<td>Eagles (130)</td>
<td>38.5</td>
<td>16.9</td>
<td>44.6</td>
</tr>
<tr>
<td>Non-Eagles (37)</td>
<td>55.4</td>
<td>30.0</td>
<td>14.6</td>
</tr>
<tr>
<td>Eagles (34)</td>
<td>73.5</td>
<td>5.9</td>
<td>20.6</td>
</tr>
<tr>
<td>Non-Eagles (18)</td>
<td>88.9</td>
<td>0.0</td>
<td>11.1</td>
</tr>
<tr>
<td>Eagles (16)</td>
<td>56.3</td>
<td>12.5</td>
<td>31.2</td>
</tr>
<tr>
<td>Eagles (20)</td>
<td>15.0</td>
<td>25.0</td>
<td>60.0</td>
</tr>
<tr>
<td>Non-Eagles (22)</td>
<td>26.4</td>
<td>19.4</td>
<td>54.2</td>
</tr>
<tr>
<td>Eagles (92)</td>
<td>23.9</td>
<td>20.7</td>
<td>55.4</td>
</tr>
<tr>
<td>Non-Eagles (37)</td>
<td>21.6</td>
<td>13.5</td>
<td>64.9</td>
</tr>
<tr>
<td>Eagles (43)</td>
<td>20.9</td>
<td>14.0</td>
<td>63.1</td>
</tr>
<tr>
<td>Eagles (11)</td>
<td>18.2</td>
<td>36.3</td>
<td>45.5</td>
</tr>
<tr>
<td>Non-Eagles (30)</td>
<td>33.3</td>
<td>30.0</td>
<td>36.7</td>
</tr>
</tbody>
</table>

TRAPPING CONDITIONS

Most of the raptors were admitted between October and January, corresponding to the regional furbearer trapping season. The trapping conditions were not known in all cases. Most of the traps were reported as toothless, unpadded fox sets, sizes 1% or 2. Other types of trap sets included muskrat, mink, otter, raccoon, and coyote.

The raptors probably were in the trap only overnight in most cases, but it was usually another day or two before they were presented for treatment. Several of the eagles and Great Horned Owls had flown for several days with the trap still attached to a toe or leg before they could be caught.

The vast majority of the raptors were caught by the toes or legs in a ground set baited with a carcass. However, Cooper (1977) concurs with our findings that raptors are also attracted to traps where no exposed bait is used if there is activity from other animals at the set. For instance, a Screech Owl was caught in a muskrat set baited with corn which had probably attracted small rodents and, in turn, the owl. A Great Horned Owl was caught with a raccoon in a fox trap. In rare instances raptors can also be trapped in underwater sets, as in the case of a Bald Eagle that was caught by an underwater otter set that had been baited with a fish placed under a rock; the eagle was apparently attracted by the floating fish scales. (The Bald Eagle is primarily a fish eater.)
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Most of the raptors were admitted between October and January, corresponding to the regional furbearer trapping season. The trapping conditions were not known in all cases. Most of the traps were reported as toothless, unpadded fox sets, sizes 1½ or 2. Other types of trap sets included muskrat, mink, otter, raccoon, and coyote.

The raptors probably were in the trap only overnight in most cases, but it was usually another day or two before they were presented for treatment. Several of the eagles and Great Horned Owls had flown for several days with the trap still attached to a toe or leg before they could be caught.

The vast majority of the raptors were caught by the toes or feet in a ground set baited with a carcass. However, Cooper (1977) concurs with our findings that raptors are also attracted to traps where no exposed bait is used if there is activity from other animals at the set. For instance, a Screech Owl was caught in a muskrat set baited with corn which had probably attracted small rodents and, in turn, the owl. A Great Horned Owl was found with a raccoon in a fox trap. In rare instances raptors can also be trapped in underwater sets, as in the case of a Bald Eagle that was caught by an underwater otter set that had been baited with a fish placed under a rock; the eagle was apparently attracted by the floating fish scales. (The Bald Eagle is primarily a fish eater.)

**TABLE 4. Outcome of Trapping Injuries**

<table>
<thead>
<tr>
<th></th>
<th>Released</th>
<th>Crippled</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Admissions</td>
<td>43.5</td>
<td>29.4</td>
<td>35.6</td>
</tr>
<tr>
<td>(wild eagles)</td>
<td>45.8</td>
<td>26.7</td>
<td>27.3</td>
</tr>
<tr>
<td>(1972-1979)</td>
<td>33.5</td>
<td>29.7</td>
<td>36.8</td>
</tr>
<tr>
<td>All Trapping Admissions (1972-1980)</td>
<td>43.6</td>
<td>44.6</td>
<td>43.6</td>
</tr>
<tr>
<td>Eagles (36)</td>
<td>33.3</td>
<td>19.5</td>
<td>47.2</td>
</tr>
<tr>
<td>Non-Eagles (94)</td>
<td>40.4</td>
<td>16.0</td>
<td>43.6</td>
</tr>
<tr>
<td>(1972-1980)</td>
<td>43.6</td>
<td>44.6</td>
<td>43.6</td>
</tr>
<tr>
<td>Eagles (16)</td>
<td>56.3</td>
<td>12.5</td>
<td>31.2</td>
</tr>
<tr>
<td>Non-Eagles (18)</td>
<td>88.9</td>
<td>0.0</td>
<td>11.1</td>
</tr>
<tr>
<td>(1972-1980)</td>
<td>43.6</td>
<td>44.6</td>
<td>43.6</td>
</tr>
<tr>
<td>Eagles (131)</td>
<td>45.8</td>
<td>26.7</td>
<td>27.3</td>
</tr>
<tr>
<td>Non-Eagles (958)</td>
<td>33.5</td>
<td>29.7</td>
<td>36.8</td>
</tr>
<tr>
<td>(1972-1980)</td>
<td>43.6</td>
<td>44.6</td>
<td>43.6</td>
</tr>
<tr>
<td>Eagles (34)</td>
<td>73.5</td>
<td>5.9</td>
<td>20.6</td>
</tr>
<tr>
<td>Non-Eagles (37)</td>
<td>33.3</td>
<td>19.5</td>
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<td>43.6</td>
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</tr>
<tr>
<td>Eagles (11)</td>
<td>18.2</td>
<td>36.3</td>
<td>45.5</td>
</tr>
<tr>
<td>Non-Eagles (30)</td>
<td>33.3</td>
<td>30.0</td>
<td>36.7</td>
</tr>
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Anatomical Considerations

There are a number of anatomical differences between birds and mammals that warrant separate consideration of the severity of trapping injuries to birds (Nickel et al., 1977; Cooper, 1978). First and most importantly, birds have a very limited amount of soft tissue in the distal portion of the leg. The muscle mass of mammals which can serve to cushion injury to blood vessels, nerves and bones is replaced in birds by a system of long tendons. The vascular supply to the extremities is also reduced. Thus, birds have limited ability to fight infection of the foot. A fracture of the distal part of the leg is less likely to heal (immobilization of the fracture is required in any case), and as the vascular supply to the extremities is easily cut off by constriction of the leg by a leghold trap or snare, the limb is likely to freeze overnight even without gross indication of injury.

Second, as predatory and perching birds, the full use of both feet is important to a raptor's survival in the wild. The hallux (the opposable toe) and at least one or two other toes of the same foot are necessary for grabbing and holding onto prey. Proper distribution of the bird's weight requires that the bird have both feet to stand on to prevent deterioration of the epithelium of the foot pad (Cooper, 1978; McKeever, 1979).

Third, the wings must be free of fractures, injuries to the joints, or damaged flight feathers. A raptor that cannot fly with speed and maneuverability must rely on finding carrion.

Description and Outcome of Injuries

The nature of the trapping injuries upon admission with respect to species size is presented in Table 3, and the outcome of those injuries in terms of release, crippling or mortality is presented in Table 4. The release rates reflect superior veterinary care; the likelihood of survival without medical treatment or the provision of food and shelter during convalescence would have been far lower. Release data are further broken down in Table 5 to account for the proportion of raptors released without the extremity. (See later section, "Problems Faced by One-Footed Raptors.") Tables 4 and 5 are based on only about 130 of the 173 trapping admissions, as some of the early medical records are incomplete. As part of the analysis of injury and outcome with respect to bird size, data on eagles are compared to that of the other, smaller species, countering the incorrect assumption that eagles are more tolerant of trapping injuries because of their larger size.

Toe Injuries

Toe injuries represented a minority of trapping injuries. Large raptors were more likely than small raptors to be caught by just a toe rather than by the foot or leg; 44% of the eagles versus 19% of the smaller raptors were caught by just a toe(s) (Table 3). Toe injuries can involve toe(s) of both feet.

Raptors with toe injuries were held on the average for about a month before they were released. The major complication was infection of the foot, which as mentioned earlier is extremely difficult to treat in raptors (Fig. 2). Several birds required intensive veterinary care for up to 6 months or more to combat infection. Chronic infections of that duration often lead to arthritic changes or destruction of the nerves or tendons, resulting in the loss of function of the foot or toe(s) (Cooper, 1978).

Most of the raptors with toe injuries were released (74%). Fewer eagles were released than other species (56% and 89%, respectively). Only about one fifth of the raptors with toe injuries could be released with all toes still intact and functional. Toe injuries represented a very low rate of permanently crippled birds (6%); if they survived problems of shock and infection they could usually be released. Even so, 21% of raptors with toe injuries (31% of the eagles) died in spite of what might be considered an inconsequential injury, usually from a secondary bacterial infection (Table 4).

TABLE 5. Trapping Admissions Released With Regard to Amputation of the Limb

<table>
<thead>
<tr>
<th></th>
<th>Eagles</th>
<th>Non-Eagles</th>
</tr>
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<tbody>
<tr>
<td>Toe Injuries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Released</td>
<td>56.3% (8)</td>
<td>88.9% (12)</td>
</tr>
<tr>
<td>Released Without Amputation of Toe(s):</td>
<td>21.1 (3)</td>
<td>22.2 (3)</td>
</tr>
<tr>
<td>Leg Injuries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Released</td>
<td>15.0% (3)</td>
<td>26.4% (17)</td>
</tr>
<tr>
<td>Released Without Amputation of Foot:</td>
<td>5.0 (1)</td>
<td>15.5 (10)</td>
</tr>
</tbody>
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Figure 2 Golden Eagle with severe wound infection resulting from amputation of a toe by a ground set. After several months of intensive treatment the infection was eradicated, but the epithelium of the other foot had irreparably deteriorated. The eagle eventually died from complications related to the trapping injury.

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Figure 2. Golden Eagle with severe wound infection resulting from amputation of a toe by a ground set. After several months of intensive treatment the infection was eradicated, but the epithelium of the other foot had irreparably deteriorated. The eagle eventually died from complications related to the trapping injury.
Leg injuries: fracture or amputation

Most of the raptors were caught by the leg (Table 3), and in many instances both legs were fractured or lacerated. The larger raptors were less likely than the smaller species to incur a fracture (or amputation) of the limb if caught by the leg (35% of the eagles versus 54% of the other species) (Table 3). A leg fracture requires immobilization for the bone to heal; thus it would not be expected that a raptor with a leg fracture would survive if released without treatment. Raptors with leg injuries were detained for an average of 1.5 months and sometimes much longer. A fracture usually requires 3-4 weeks to heal, and there may be other complications to be considered in the evaluation of the bird before the bird is considered suitable for release. 17% of the eagles and 21% of the other species admitted with leg fractures were released, mostly as one-footed birds. Mortalities were very high, claiming 65% of all the birds in this category (Table 4).

Cooper (1977) cited a very high mortality among raptors with fractured or severed legs; they were more likely to be found dead in the trap or, if found alive, to die in spite of attempts at rehabilitation. He believed that the circumstances involving a leg fracture were accompanied by greater stresses, which would compound the likelihood of the raptor dying from shock, exhaustion or exposure. In Cooper's study, the hawks and owls (as the smaller species) were more likely to incur fractures and to be found dead in the trap than were the eagles.

Leg injuries: soft tissue damage

Irrespective of whether the leg is fractured, there will usually be soft tissue damage to the leg at the point where it was trapped and therefore to the extremity as well. The soft tissue damage that results in the loss of the extremity is usually due to impairment of the vascular supply by the constriction of the leg while in the trap, vascular injury resulting in thrombosis, or laceration of the blood vessels. Thus, offset-jawed traps and leg snares will also cause soft tissue injury by constriction of the leg if the bird is not removed in time (Cooper, 1978).

The initial sign that the foot has been destroyed is a swelling of the tissues and a dark orange discoloration appearing a few days after the bird has been trapped. Over the next week or two the foot gradually shrivels and turns black, and the epimysium dries out and starts to peel. The foot will then snap off. By the time a raptor with this kind of injury has been presented for treatment, it is too late to save the foot. Of the raptors received for leg injuries involving only soft tissue damage and which survived long enough for assessment of the severity of the injury, 85% had irreparable damage that would result in loss of the foot. Unfortunately, persons who are unfamiliar with the serious nature of this kind of injury would probably assume that they could release these birds from the trap “without serious injury.”

A similar pattern of necrosis results if the foot has frozen due to vascular impairment combined with an inability to shelter the entrapped limb. Frozen tissue does not regenerate. Further, frostbite or septicemia can cause cardiovascular lesions in birds (Angrist et al., 1960; Wallach and Flieg, 1969; Redig, 1979) which will shorten their expected life span. Death can also result from exposure and limb necrosis due to injury from the cold (Wallach and Flieg, 1969).

The mortality from soft tissue injury to the leg was less than that from leg fractures: only 4% of the eagles and 37% of the other species (Table 4). A leg fracture, in contrast, caused a decrease in mortality of 20% for the eagles and 66% respectively, for leg fractures. This decrease in mortality was countered by a 126% increase in the crippling rate, but only a 40% increase in the proportion of raptors released. More of these birds can be kept alive (pending the complications encountered by one-footed birds), but there is little that can be done to save the foot. Thus, for about 93% of the raptors (eagles or others) admitted for leg injuries, the leg was either fractured or completely severed, or irreversible damage to the soft tissue had occurred. Therefore, even before accounting for mortality from wing damage, shock, exposure, exhaustion, or other complications, very few of the raptors caught by the leg could have survived if released from the trap without treatment.

Wing injuries

Some of the raptors had incurred sufficient damage to the wings to make them unable to fly at the time they were found. Even if these birds could have recovered without veterinary treatment, they would have starved without the provision of food and shelter during convalescence.

Wing damage is usually a secondary injury incurred while thrashing about in the trap. If the bird is not removed from the trap in time, such behavior will result in bruising of the wrist joints (the metacarpals), broken feathers, and sometimes broken bones. Bald Eagles and other raptors have been found moribund several days after having been released from a trap (the injuries having been judged to be inconsequential) because the wings were too damaged to permit flight. The chance of successfully rehabilitating such a bird is compromised by the delay in admission and the resultant aggravation of the bird's debilitated condition.

In one case a Golden Eagle incurred primary injury of one of its wings after the trap trigged the set and cut off six of the primary flight feathers (essential for flight). The eagle was released six months later after new feathers grew in. It was otherwise in excellent condition, but it would have starved to death if left in the wild.

Problems Faced by One-Footed Raptors

A one-footed raptor faces two major problems. First, the ability to use both feet is an important part of its weaponry in the wild. An older bird with extensive hunting experience may be able to cope with the loss of a foot; the fact that a few adult one-footed birds have been admitted to the clinic for other reasons over the years attests to this possibility. However, such a bird must rely more on scavenging, and therefore has a greater chance of being killed, either from poisoned bait, from a car collision, while feeding on a roadkill, or from being trapped once again. Inexperienced one-footed raptors have virtually no chance of survival and should not be released.

The second problem affects the bird's chance of survival regardless of whether it is released or kept in captivity and therefore makes the advisability of releasing one-footed raptors, experienced or not, highly questionable. Many rehabilitators advise against it entirely (Cooper, 1978; McKeever, 1979). The additional weight borne by the good foot invariably leads to deterioration of the foot pad and allows infection to invade. As mentioned earlier, a foot infection is extremely difficult to treat, especially if it occurs in the only foot the bird has to stand on. One-footed raptors that have developed an infection in the remaining foot usually must be euthanized.

A similar situation occurs for two-footed raptors when one of the feet is temporarily bandaged because of an infection or fracture (a situation that occurs in treatment for trapping and other injuries). During the healing period the other foot bears most of the weight and may deteriorate before the raptor can use both of its feet again. Avoiding foot problems of this nature is the single largest management problem in treating or holding raptors in captivity. Thus, one-footed raptors held in captivity that have survived the initial period of shock and infection and are otherwise...
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wise in good health can be expected to develop complications leading to their death or requiring humane destruction.

**Release Considerations and Mitigation Potential**

It is necessary to hold for at least one week any raptor suspected of having been caught in a leghold trap to determine the extent of soft tissue damage and to stabilize the bird's condition. If the raptor has been injured by the trap, there are a number of factors which must be satisfied before it can be released (McKeever, 1979; Cooper et al., 1980):

1. The bird should have full use of both feet, although the loss of one or more toes may be tolerated if the raptor can kill prey. Anything less compromises its ability to compete in the wild, and, in the case of the loss of a foot, also subjects the bird to deterioration of the remaining foot.
2. Fractures of the leg or wing must have completely healed, and the appropriate physical therapy must be undertaken to assure full use of the limb.
3. Infection must be eradicated, or it will quickly worsen after the bird is released.
4. The wings must be in good condition, and the bird must be a strong and able flyer.
5. The bird must have achieved a suitable weight, and be free of disease, excessive parasite loads, and the hematological disorders that can accompany starvation or chronic infection.

Only highly qualified facilities are likely to be able to release such a raptor to the wild in the condition necessary for it to have a reasonable chance of survival. (Rehabilitation of wildlife animals requires state and federal permits.)

**Acknowledgements**

The author gratefully acknowledges the assistance and expertise of Dr. Patrick T. Redig and Steven H. Herman in the preparation of the manuscript.

**References**


Associated with rehabilitation admissions, but fewer survive as permanently crippled birds that could replace healthy individuals in zoos, research, or breeding programs.

**Conclusions and Recommendations**

A far greater rate of crippling and mortality of raptors results from leghold trap injuries than might be expected based on initial examination of the bird at the time of capture. Because of the limited soft tissue of distal regions of the avian leg, the blood vessels are easily constricted or damaged, invariably causing irreversible damage to, and loss of, the extremity. Therefore, “serious injury” as applied to raptors must include consideration of soft tissue damage as well as the fracture or amputation of the leg. Any raptor caught by a leghold trap in the course of furbearer trapping activities, especially one that has been in the trap overnight, should be considered seriously injured, regardless of how inconsequential the injury may appear when the bird is found, as the absence of irreparable soft tissue damage cannot be determined for several days. The larger raptors, which would be less likely to incur leg injuries or leg injuries involving fractures, are as susceptible as the smaller species to the soft tissue damage that results in the loss of the limb or the development of a severe wound infection.

Raptors are most often caught in open bait land sets. Therefore, the main deterrent to the capture and thus the crippling or mortality of raptors in leghold traps is prohibition of the use of open bait sets (Beasom, 1974; Cooper, 1977). Smaller, padded or offset-jawed traps or leg snares are not acceptable, as they are as applied to raptors. The mitigation potential of treating raptors with trapping injuries is rather limited. Furthermore, the seemingly innocuous appearance associated with soft tissue injuries would dissuade the public from presenting many of those birds for treatment. Even many of the regional wildlife managers, who for years have willingly brought us injured raptors and are aware of our views about the seriousness of trapping injuries, are reluctant to consider a trapping injury as a matter requiring veterinary care.

Rehabilitators may be tempted to release one-footed raptors, despite a very guarded prognosis, so that some of the trapping admissions might have a chance in the wild again. However, the release of a one-footed bird is quite different from one admitted for a wing fracture (such as from a projectile injury or collision); depending on factors such as the age and location of the fracture, most fractures can be repaired by qualified personnel so that the raptor will have full use of its wing again and its survival in the wild will not be compromised. It should nevertheless be recognized that many of the birds with trapping injuries will be released in a degenerating condition, which means that release data on trapping admissions will tend to inflate the percentage that was truly rehabilitated. Thus, not only are fewer raptors successfully treated for trapping injuries than for other problems commonly
wise in good health can be expected to develop complications leading to their
death or requiring humane destruction.

**Release Considerations and Mitigation Potential**

It is necessary to hold for at least one week any raptor suspected of having
been caught in a leghold trap to determine the extent of soft tissue damage and to
stabilize the bird's condition. If the raptor has been injured by the trap, there are
a number of factors which must be satisfied before it can be released (McKeever,
1979; Cooper et al., 1980):

1. The bird should have full use of both feet, although the loss of one or more
   toes may be tolerated if the raptor can kill prey. Anything less compromises its abil-
   ity to compete in the wild, and, in the case of the loss of a foot, also subjects the bird
to deterioration of the remaining foot.

2. Fractures of the leg or wing must have completely healed, and the appropri-
   ate physical therapy must be undertaken to assure full use of the limb.

3. Infection must be eradicated, or it will quickly worsen after the bird is re-
   leased.

4. The wings must be in good condition, and the bird must be a strong and able
   flyer.

5. The bird must have achieved a suitable weight, and be free of disease, ex-
   cessive parasite loads, and the hematological disorders that can accompany starva-
   tion or chronic infection.

Only highly qualified facilities are likely to be able to release such a raptor to
the wild in the condition necessary for it to have a reasonable chance of survival.
(Rehabilitation of wild animals requires state and federal permits.)

**References**

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**K. Durham — Injuries to Birds of Prey Original Article**

associated with rehabilitation admissions, but fewer survive as permanently crippled
birds that could replace healthy individuals in zoos, research, or breeding programs.

**Conclusions and Recommendations**

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A number of western states regulate the use of open bait sets specifically to
reduce the high incidence of raptor deaths, especially eagles. (See list in Nilsson,
1980 of states which prohibit or restrict exposed bait sets.) Any state that permits the
use of land traps for furbers should adopt a regulation prohibiting the use of ex-
posed carnation within approximately 25 feet of the trap. Andrus (1979) recommended
that open bait sets not be used in the federal Animal Damage Control program.

Persons involved in the setting or checking of traps, such as trappers, state
game wardens and other members of the public or wildlife agencies, should be edu-
cated as to the serious nature of trapping injuries to birds and encouraged to use
trapping methods that will not attract raptors and to present for rehabilitation or
humanely destroy any raptors found in a leghold trap rather than releasing them
from the trap.

**Acknowledgements**

The author gratefully acknowledges the assistance and expertise of Dr. Patrick
T. Redig and Steven H. Herman in the preparation of the manuscript.
Equine Behavior Problems in Relation to Humane Management

Katherine A. Houpt

The behavior problems of horses are frequently related to management practices. Behaviors that are termed stall vices appear to be either stereotyped behaviors that occur in reaction to stress, or patterns that emerge when natural behaviors such as grazing are prevented. The behavior cases presented to the New York State College of Veterinary Medicine, Cornell University, were tabulated: 27% were stall vices and 27% were some form of aggression. The stall vices were circling, digging, kicking the stall, chewing wood, swallowing air or self-mutilation. Management of horses on pasture rather than in stalls prevents the development of many of these stall vices and should, therefore, be considered a more humane treatment particularly for those horses that do not adapt well to confinement.

Aggression toward other horses is a problem that results from isolating horses, which prevents formation of the normal equine social hierarchy. The social structure of free-ranging and domestic horse herds is reviewed in order to compare it with the structure created by modern management practices.

Behavior patterns under natural and various management regimes are also compared.

Introduction

There was a time when cruelty to horses was widespread. When everyone depended on horses for transportation and as a source of energy for pulling, lifting and generating power, many horses were beaten, underfed and allowed to die from neglect or infectious disease. The excesses portrayed in novels such as Anna Sewell's Black Beauty (1949) were not imaginary. One would assume now that horses are used for pleasure (either entertainment or recreation), there would be little inhumane treatment of the species. By and large that is true. The more obvious forms of abuse such as "soring," i.e., creating wounds on a Tennessee Walking horse's legs so it will lift its hooves higher, have been declared illegal (Horse Protection Act Amendments of 1976). Nevertheless, there are still situations in which horses are mistreated. The forms of mistreatment are much more subtle. In addition, the mistreatment is often a result of environmental factors rather than a direct result of the owner's action. There are two general areas in which care must be taken to consider the well-being of the horse: stable management and social environment.

Modern equine management is a science rather than an art in many respects. Knowledge of equine nutrition has increased to the point where mineral balance as well as protein and energy content are considered in formulating a ration. The advances in reproductive science have also been extensive. The result is that horses, once seasonal breeders, can now conceive at any time of year (Ginther, 1979). The problems that arise, however, are a result of some technological advances and of urbanization. In considering stress on livestock, Ewbank (1973) has given three criteria for determining if a given situation is stressful: 1) changes in behavior that result in a...
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decrease in productivity; 2) changes in behavior that do not affect productivity; 3) changes in patterns of behavior without changes in type of behavior. When one applies these criteria to the horse, one can find examples of all of these responses to stress. Some horses do refuse to jump, to run, or to reproduce. More common are problematic changes in the horse's behavior. Not all behavior problems in horses are a result of inhumane treatment or even of mismanagement, but one type of problem is often the result of management practices. This type is the so-called stall or stable vice. The horse misbehaves, not when it is being ridden, but rather while in its stall. The important phrase is "in the stall" because some horses do not adapt as well as others to stall confinement.

The New York State College of Veterinary Medicine offers counsel on and treatment of behavior problems as well as medical services to large and small animals. The cases of abnormal or objectional behavior of horses presented reflect the responses to stress produced by management. See Table 1 for the types of cases seen. Examples will be presented of typical clinical cases that are either losses of productivity, changes in behavior, or changes in behavior patterns without changes in type of behavior.

### TABLE 1. Categories of Equine Behavior Problems Seen at the New York State College of Veterinary Medicine — 1980

<table>
<thead>
<tr>
<th>Vices</th>
<th>Number of Cases</th>
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<tbody>
<tr>
<td>Stable vices</td>
<td>27%</td>
</tr>
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<td>Aggression</td>
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</tr>
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<td>Trailer problems</td>
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</tr>
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</tr>
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**Stall Vices—Oral**

**Wood chewing**

The abnormal behaviors associated with stall confinement can take several forms. Either ingestive behavior or locomotion is affected. Of the so-called oral vices of horses, wood chewing is probably the most common. This is an example of a change in behavior pattern. Wood chewing is not restricted to stalled horses; it can also be observed in horses kept in paddocks. This is a clue that confinement alone is not the cause, although confinement usually aggravates the condition. Lack of roughage in the diet predisposes a horse to wood chewing. Horses fed hay chew less wood than horses fed a high energy, low roughage diet. There may be an innate preference or even a craving for roughage in horses. True herbivores spend 60-90 percent of their time grazing when on pasture or range (Duncan, 1980; Tyler, 1972; Wells and Goldschmidt-Rothschild, 1979) and consume browse or woody plants as well as grass. The horse kept in a stall 23 hours a day may chew up to a pound of wood from the edge of the stall rather than the more succulent twigs it would prefer. Willard et al. (1977) found that ponies kept in stalls and fed a high-concentrate diet spent 10% of their time eating wood. This dropped to 2% when a high roughage diet was substituted. There have been no quantitative studies of wood chewing in horses in paddocks or corrals, but when neither hay nor pasture is available the horse may chew the fence. We have noted that wood chewing is inhibited by inclusion of sawdust in a high concentrate diet. Although this is one "treatment," access to pasture with nonpoisonous woody plants available and/or feeding of hay would be the best management procedure.

It is easy to recommend pasture, but difficult for many horse owners to find pasture. With increasing urbanization and increasing ownership of horses it is inevitable that many horses will be kept in suburban or even urban areas. There is no pasture and little room to keep hay, were it easily available. Complete pelleted feeds made of grain and chopped hay is a common diet of the modern horse. Such a diet is nutritionally adequate, but the horse may respond by literally eating down the barb around it. The prospective horse owner should therefore consider the circumstances under which the horse will live before acquiring the animal.

**Cribbing and wind sucking**

A second oral vice of horses is termed "cribbing," or crib biting. When cribbing, a horse grasps the edge of its manger or wall with its teeth, arches its neck, and swallows air. A few horses do not need to grasp an object with their teeth, but still swallow air ("wind sucking"). There is some question as to whether cribbing results in poor digestion or poor digestion results in cribbing. It is often more annoying to the owner than dangerous to the horse. Nevertheless, surgical treatments such as removal of six inches of each of three pairs of ventral neck muscles, the omohyoideus, sternopelvis and sternothyroideus, have been recommended (Frank, 1959). More recently, bilateral ventral accessory neurectomy has been advocated, but after a few months the cribbing horse may begin again (Firth, 1980). Mechanical devices to inhibit arching of the neck, usually straps around the upper neck, are the most common treatment of cribbing. This treatment usually prevents the behavior, but does not remove the cause of the behavior as a proper treatment should. Once cribbing becomes a habit the horse may continue it, even on pasture. There is a widely held belief among horsepeople that cribbing is "contagious," that is, if one horse cribbs all or at least some of the other horses will follow suit. This may be social facilitation of the behavior, or an indication that the environment is predisposing to the development of stable vices.

**Stall Vices—Locomotor**

**Kicking, weaving and pacing**

Certain other types of stable vices are forms of locomotion, perhaps even of escape behavior. These vices are pawing, kicking the wall, circling and weaving and digging in the stall. Stall kicking is the most obvious because the reverberations are heard for long distances. The cause of this type of behavior, like that of so many other vices, is unknown, but it may be a lack of stimulation. A 9 year old Thoroughbred gelding was presented with a history of "stall walking." The horse circled when confined and had been doing so for 5 years. This case may fall into the category of a decrease in productivity, as the horse had been retired from the race track because of its behavior. It expended too much of its...
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energy circling in the stall to race well. Well-meaning but ill-informed horse owners may attempt to deal with stable vices by preventing the animal from engaging in the objectionable motor activity without attempting to eliminate the cause of the misbehavior. In this case the horse had been tied so tightly that it could not circle or pace. The horse responded by weaving, that is, by shifting its weight from side to side without progressing forward. The owners realized immediately that tying was not a cure. They then gave the horse the freedom of a large aisle in the barn. The horse continued to circle at one end of the aisle. The owners had noted that exercise tended to decrease the circling and that preparations for a horse show or hunt increased the incidence of the behavior. They were advised to keep the horse on pasture with other horses, and allow the horse free access to the barn in winter. The owners lived on a farm so that this was easily accomplished. The horse did not circle on pasture. Confinement, even in a large enclosure, was apparently the cause of the behavior.

One pony stallion that was used to "tease" Thoroughbred mares, is allowed to approach and sniff, but not to copulate, began to weave in his stall. How often stall vices are such a direct result of frustration of sexual or other behaviors is unclear, but many horses that circle or weave in confinement do not do so on pasture in the company of other horses.

Another case involved two horses in the same environment, each of which exhibited stable vices. The 5 year old mare paced in her stall. The 2 year old gelding kicked at the walls of the stall and bit itself. A detailed history is always obtained from the owners of horses with behavior problems. The history of these two animals was particularly enlightening, revealing that the gelding was the son of the mare. The owners had inadvertently perpetuated a family of horses that do not respond well to confinement. The gelding not only showed abnormal behavior, but also a loss of productivity or usefulness because while kicking it had injured its hind legs severely enough to require veterinary care.

Horses moved from dirt-floored, well-bedded stalls to ones with wooden floors may cease to kick the stall, as if the noise of their hooves striking the floor were sufficient stimulation. Other suggested treatments have been to pad the stall or to hang a large ball on the horse’s tail so that it hits the horse whenever it kicks. The padded stall should be used if the horse has a hind leg injury that is aggravated by the jolt of contact with the wall, but in other circumstances the owner may only be removing the reward value of the behavior without removing the cause.

Pawing

Pawing is a normal behavior of horses. They paw when they are attempting to run or attempting to reach food, but are prevented from doing so (Öödberg, 1973). Some horses paw while eating freely available grain. The reason for this response is unknown. Pawing in the above circumstances would not be considered a vice, some horses paw so frequently that they dig holes in the stall. Horses usually cannot paw through concrete floors, but this approach, like the cribbing strap, is not removing the cause of the behavior. The cause is unknown, but since it occurs most frequently in stalled horses and least frequently in horses pastured in groups, the confinement and social isolation of the stall environment are implicated.

An extreme example of digging was presented by a 2 year old Standardbred horse. It had been housed in a runout shed. When transferred to a stall it began to paw, and dug holes 3 feet deep. When plywood was placed in the stall 10 inches below sawdust, the horse dug down to it. Punishment has not alleviated the condition. A stall companion, return to a runout environment and training the horse not to paw by rewarding it with food were suggested in order of probability of reducing the incidence.

Other Stall Vices

One of the stall vices that can be dangerous to the horse itself is flank biting. Horses with this habit bite at their sides usually only damaging the hair, but occasionally mutilating themselves. This behavior is not the quiet gnawing similar to that of a dog chewing its paws, but is an intense behavior in which anyone in the way may be injured. In most cases stall kicking and vocalization accompany the biting.

Three separate cases were presented of horses that bit themselves. All were males, and the problem does appear to be more common in stallions than in castrated males. All occurred at the height of the equine breeding season. None of these animals had any medical problem, such as pruritic dermatitis, gastrointestinal pain or heavy intestinal parasitism, that would be responsible for such behavior. One case was interesting in that the biting began when the stallion's dam was brought to the stallion's stall after a 4 year separation. The animals had not been together since the stallion was weaned. The most severe case was a Thoroughbred stallion that began to bite itself as soon as it was retired from racing. Tranquilizers had little or no effect. When a cradle was placed on the horse so that it could not reach its flanks it continued to rear and twist attempting to bite itself. Despite the violence of the horse’s behavior, the problem was easily resolved. The stallion was placed in pasture with a barren mare. The biting ceased and the barren mare was soon pregnant. (Dr. Julie Wilson of the College of Veterinary Medicine, University of Florida, Gainesville provided this case.) When pasture is not available, provision of a stall companion such as a donkey sometimes helps to ameliorate the problem.

A final case of failure to adapt to stall confinement was a 4 1/2 year old Quarter-horse that had been raised in a field until the age of 3 1/2. When confined in a stall the horse tried to escape by climbing out, tunneling out under the sides, or by learning on the door. When not engaged in more active attempts to escape she circled, pawed or weaved. This behavior persisted for one year. She also tried and often succeeded in escaping from a paddock, but presented no problem when kept in the field with other mares. The early history of this horse may account for her adult behavior problems. Perhaps if she had been accustomed to confinement alone or even with her dam she might not have reacted so badly to stalls and paddocks as an adult. Because most horses must be stalled, it would be wise to provide some experience of stalls to foals and ease their adjustment to common management situations.

A problem we have not yet encountered in a clinical patient, but have seen in experimental ponies, is polydipsia nervosa, or psychogenic polydipsia. It occurs most often in isolated, confined horses that have free access to water. Usually the only disadvantage is the amount of urine produced when a horse drinks 100 or more liters per day, but gastrointestinal pathology may result (Fraser, 1980).

Learned Behavior

Stall vices are not always responses to stress. At times the particular behavior may have been rewarded and the horse continues to perform the behavior. A horse...
energy circling in the stall to race well. Well-meaning but ill-informed horse owners may attempt to deal with stable vices by preventing the animal from engaging in the objectionable motor activity without attempting to eliminate the cause of the misbehavior. In this case the horse had been tied so that it could not circle or pace. The horse responded by weaving, that is, by shifting its weight from side to side without progressing forward. The owners realized immediately that tying was not a cure. They then gave the horse the freedom of a large aisle in the barn. The horse continued to circle at one end of the aisle. The owners had noted that exercise tended to decrease the circling and that preparations for a horse show or hunt increased the incidence of the behavior. They were advised to keep the horse on pasture with other horses, and allow the horse free access to the barn in winter. The owners lived on a farm so that this was easily accomplished. The horse did not circle on pasture. Confinement, even in a large enclosure, was apparently the cause of the behavior.

One pony stallion that was used to "tease" Thoroughbred mares, that is, allowed to approach and sniff, but not to be copulated, began to weave in his stall. How often stall vices are such a direct result of frustration of sexual or other behaviors is unclear, but many horses that circle or weave in confinement do not do so on pasture in the company of other horses.

Another case involved two horses in the same environment, each of which exhibited stable vices. The 5 year old mare paced in her stall. The 2 year old gelding kicked at the walls of the stall and bit itself. A detailed history is always obtained from the owners of horses with behavior problems. The history of these two animals was particularly enlightening, revealing that the gelding was the son of the mare. The over-exuberance of the gelding frequently perturbs a family of horses that do not respond well to confinement. The gelding not only showed abnormal behavior, but also a loss of productivity or usefulness because while kicking it had injured its hind legs severely enough to require veterinary care.

Horses moved from dirt-floored, well-bedded stalls to ones with wooden floors may cease to kick the stall, as if the noise of their hooves striking the floor were sufficient to stimulate other vices. Other suggested treatments have been to pad the stall or to hang a large ball on the horse's tail so that it hits the horse as it kicks. The padded stall should be used if the horse has a hind leg injury that is aggravated by the jolt of contact with the wall, but in other circumstances the owner may only be removing the reward value of the behavior without removing the cause.

Pawing

Pawing is a normal behavior of horses. They paw to reach grass buried under snow, but they also paw in many other circumstances. A mare may paw her foal to rule it. If the foal is unable to rise, the pawing may actually injure the animal. Horses paw when they are attempting to run or attempting to reach food, but are prevented from doing so (Ödberg, 1973). Some horses paw while eating freely available grain. The reason for this response is unknown. Pawing in the above circumstances would not be considered a vice, but some horses paw so frequently that they dig holes in the stall. Horses usually cannot paw through concrete floors, but this approach, like the cribbing strap, is not removing the cause of the behavior. The cause is unknown, but since it occurs most frequently in stalled horses and least frequently in horses pastured in groups, the confinement and social isolation of the stall environment are implicated.

An extreme example of digging was presented by a 2 year old Standardbred horse. It had been housed in a runout shed. When transferred to a stall it began to paw, and dug holes 3 feet deep. When plywood was placed in the stall 10 inches below sawdust, the horse dug down to it. Punishment has not alleviated the condition. A stall companion, return to a runout environment and training the horse not to paw by rewarding it with food were suggested in order of probability of reducing the incidence.

Other Stall Vices

One of the stall vices that can be dangerous to the horse itself is flank biting. Horses with this habit bite at their sides usually only damaging the hair, but occasionally mutilating themselves. This behavior is not the quiet gnawing similar to that of a dog chewing its paws, but is an intense behavior in which anyone in the way may be injured. In most cases stall kicking and vocalization accompany the biting.

Three separate cases were presented of horses that bit themselves. All were males, and the problem does appear to be more common in stallions than in castrated males. All occurred at the height of the equine breeding season. None of these animals had any medical problem, such as pruritic dermatitis, gastrointestinal pain or heavy intestinal parasitism, that would be responsible for such behavior. One case was interesting in that the biting began when the stallion's dam was brought to the stallion's stable after a 4 year separation. The animals had not been together since the stallion was weaned. The most severe case was a Thoroughbred stallion that began to bite itself as soon as it was retired from racing. Tranquilizers had little or no effect. When a cradle was placed on the horse so that it could not reach its flanks it continued to rear and twist attempting to bite itself. Despite the violence of the horse's behavior, the problem was easily resolved. This stallion was placed in pasture with a barren mare. The biting ceased and the barren mare was soon pregnant. (Dr. Julie Wilson of the College of Veterinary Medicine, University of Florida, Gainesville provided this case.) When pasture is not available, provision of a stall companion such as a donkey sometimes helps to ameliorate the problem.

A final case of failure to adapt to stall confinement was a 4½ year old Quarterhorse that had been raised in a field until the age of 3½. When confined in a stall the horse tried to escape by climbing out, tunneling out under the sides, or by leaning on the door. When not engaged in more active attempts to escape she circled, pawed or weaved. This behavior persisted for one year. She also tried and often succeeded in escaping from a paddock, but presented no problem when kept in a field with other mares. The early history of this horse may account for her adult behavior problems. Perhaps if she had been accustomed to confinement alone or even with her dam she might not have reacted so badly to stalls and paddocks as an adult. Because most horses must be stalled, it would be wise to provide some experience of stalls to foals and ease their adjustment to common management situations.

A problem we have not yet encountered in a clinical patient, but have seen in experimental ponies, is polydipsia nervosa, or psychogenic polydipsia. It occurs most often in isolated, confined horses that have free access to water. Usually the only disadvantage is the amount of urine produced when a horse drinks 100 or more liters per day, but gastrointestinal pathology may result (Fraser, 1980).

Learned Behavior

Stall vices are not always responses to stress. At times the particular behavior may have been rewarded and the horse continues to perform the behavior. A horse
may paw just before feeding one day. It receives its grain as it is pawing. The next day it paws and food appears. Soon the horse is operantly conditioned to paw to obtain food. Horses paw, shake their heads and even kick the stall for this reason as well as because they are stressed. Therefore care must be taken to determine whether there is a pattern to the behavior, that is, is it occurring more often just before feeding? In these cases the owner can teach the horse not to paw by feeding it only when it is not pawing.

An example of this type of learned behavior can be seen in a 7 year old Quarterhorse that bit his feed bucket or attacked the stall door just before feeding. Such behavior is a good example of "superstitious" actions. The horse performed the actions because food had rewarded the behavior. It is relatively easy to eliminate superstitious behavior by removing the reward. It will take a long time for the behavior to extinguish; the longer it has been rewarded the longer it will take for the animal to extinguish the response. The owner should not feed the horse if it is biting the bucket or striking at the stall door. At first the horse should be rewarded for any pause in the unwanted behavior. Later 20 seconds of good behavior will be required for a food reward. Still later half a minute will be required.

**Aggression**

The other common equine behavior problem is aggression. Aggression is not usually expected to be a common trait of a domesticated ungulate. Nevertheless an examination of the normal herd structure of the free-ranging horse and a comparison with the structure imposed under conditions of modern husbandry may help to explain the high incidence of aggression. Horses live in harem groups composed of several adult females, their offspring and usually expected to be a common trait of a domesticated ungulate. Nevertheless an example of this type of learned behavior can be seen in a 7 year old adult males (Feist and McCullough, 1976; Berger, 1977; Gates, 1979; Tyler, 1972; Miller and Denniston, 1979). The offspring are newborn foals, yearlings, and 2 or 3 year old animals. The stallions may remain with their original herd or join another herd at 2 or 3 years of age. The colts are believed to be driven off by the harem stallion when they are 2 years old. The colts do not join another herd, but form a bachelor herd or live as solitary individuals. The harem groups are stable. An older mare is the dominant animal and leads the group. The stallions ward off other males, especially young stallions from bachelor groups that attempt to appropriate mares of their own. There are dominance hierarchies within both the harem groups and the bachelor herds. Horses under 3 are usually submissive to adult horses. The dominant animal has first access to food, salt or a desirable resting area. Stallions need not be dominant over all the mares of the harem group (Houpt and Keiper, 1982), but within a bachelor herd it is the dominant stallion that is most likely to acquire mares of his own. The same or very similar dominance hierarchies exist among groups of domestic horses that are allowed to interact (Montgomery, 1957; Houpt et al., 1976; Serini and Bouissou, 1978). Overt aggression is usually minimal among groups of horses. Threats replace bites and kicks once a hierarchy is formed. Problems arise when horses are isolated from one another and have no opportunity to form a hierarchy. Addition of new horses to a group also results in high levels of aggression. When two horses meet in a ring or trail they may fight rather than merely threaten because they have not had the opportunity to determine which animal is dominant. If this aggressive behavior occurs in a crowded show ring, riders as well as horses may be injured. It is interesting to note that horses are most likely to aggress against one another when one passes another at a fast gait. Why a galloping horse is more likely to kick than a walking one is unclear. Although a good, firm rider can discipline the horse and train it to suppress its aggressive tendencies, less experienced or weaker riders will continue to have difficulty. Forced association with strange horses is the root of the problem. Horses should probably be given the opportunity to interact, first across a paddock fence and then in the same paddock to determine their relative social positions.

The large number of aggressive horses includes some that are aggressive toward humans. These animals are generally aggressive in their stalls. They turn their hindquarters toward an approaching person and threaten to kick. One can attempt to treat this behavior by punishing the horse, but many horse owners are unwilling or unable to exert the force necessary to punish the animal. A light blow often serves to irritate the animal further. In addition the punishment must be administered just as the animal misbehaves. If one waits until one has gotten a whip it will be too late. It has proved easier to reward good behavior by giving food only when the horse approaches in a friendly fashion. Many different people should approach the horse and reward it for unaggressive behavior; if only one person does so the horse will not generalize to all people. Aggression may also occur between stabled horses. Horses may bite or kick the horse in the next stall. Two questions must be answered. Are the horses actually aggressing against one another or are they playing, whiling away the many hours they must spend with nothing to do? The second question is whether the horse attacks any horse in the next stall or just one particular horse. When horses choose their own stalls aggression may be reduced because "preferred associates" will be neighbors (Clutton-Brock et al., 1976). This is true only if food is easily and always available. For example, in order to photograph another group of two horses in a barn it is only necessary to roll the feed cart down the aisle. If twenty horses are trying to feed from a hay rack built for ten, constant squabbles erupt. Crowded horses and hungry horses are most apt to be aggressive.

**Discussion**

None of the horses mentioned here had been cruelly treated. In fact, most have been owned by people devoted to the species and its improvement. Nevertheless, the environmental conditions of race horses, show horses and suburban pleasure horses are not the natural ones of the horse. The majority of horses adapt to the unnatural conditions, but a few do not. These horses probably should be removed from the environment. Since it is unlikely that the process of urbanization will be reversed, horses with these problems should not be bred. This advice pertains no matter how fast they are and no matter how well they jump, cut cattle or perform dressage. The 21st century horse, like the 21st century dog, should be one that can live quietly in confinement without further restraints such as cribbing straps or cradles to prevent abnormal behavior.

A more positive approach to the problem may be to redesign stables with the horse's behavior in mind. One apparently successful design is to stall horses so that they face one another. Most straight stalls are designed for the human with the horse's tail facing a center aisle so that the manure can easily be removed. If the horses face one another there will be more work for the stable hands. It has been noted that horses that circle in box stalls stand quietly in straight stalls, if they can...
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**Conclusions**

Horses have changed little behaviorally since they were domesticated. Although modern horses are removed from the dangers of starvation and predators, they may fall victim to the stress of confinement. The stress is reflected in a variety of behaviors known as stall or stable vices. The loss of grazing time leads to wood chewing and possibly to cribbing. The confinement itself and the solitary nature of the confinement leads to circling, weaving, pawing, self-biting, and kicking the stall. Artificially formed groups can lead to aggression and injury of horses. Every effort should be made to create as naturalistic an environment as possible for horses, but also to eliminate those horses from the breeding population that do not adapt to modern stable conditions.

**References**


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**Animal Welfare Science Essay Competition**

**Deadline: December 31, 1981**

**Two $500 Prizes**

**Competition Rules:**

- All enrolled veterinary students and graduate students in Animal Science in the U.S. (including those who have graduated within six months of the deadline) are eligible to compete.
- The two best essays, selected by a panel of judges comprised of veterinarians, philosophers, ethologists and other relevant scientists, will be awarded a cash prize of $500 and a Certificate of Appreciation. Judging criteria will include quality of writing, the accuracy of the supporting data and the extent to which opposing viewpoints have been taken into consideration and/or refuted.
- Essays should be between 4,000-5,000 words in length and may be based on literature and analyses, data gathering projects or personal viewpoints. All essays should be thoroughly documented with appropriate citations and references using the JAVMA format.
- The winners will be welcome to submit their essays to the International Journal for the Study of Animal Problems for consideration of publication.
- Copyright of the winning entries will be transferred to the institute for the Study of Animal Problems as a condition of receiving the award. The author's rights will be reserved.
- Candidates who are in doubt about the suitability of proposed topics are invited to contact Dr. Michael W. Fox for advice. Examples of subjects from which essay topics (either broader or more specific) may be selected include:
  - Trapping
  - Euthanasia Techniques
  - Predator Control
  - Laboratory Animal Welfare
  - Farm Animal Husbandry and Welfare
  - Zoo Animal Behavior Problems
  - Use of Animals in Teaching
  - Welfare of Circus Animals
  - Humaneness and Veterinary Ethics
  - Rodeo Animals/Race Horses
  - Ethical and Legal Aspects of Animal “Rights”
  - “Pet” Welfare and Owner/Breeder Responsibilities

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Legislation & Regulation

UK Agriculture Committee Welfare Recommendations

The recently published first report of the House of Commons Agriculture Committee on animal welfare contains several notable recommendations to the government of the U.K. on the housing and rearing of veal calves, pigs and poultry.

Proceeding from the conclusions reached by the Brambell Committee in 1965 on the requirements of farm animals, the Agriculture Committee concentrated its investigation on the rearing of veal calves in crates, the practice of closely confining pregnant sows and the keeping of laying hens in battery cages. In a statement to the press dated 23 July 1981, the Chairman outlined the Committee’s approach to the investigation, emphasizing its rejection of the notion that productivity is an adequate index of welfare, its careful evaluation of the advantages and disadvantages of both intensive and extensive systems of husbandry and its constant sensitivity to the possible economic consequences of suggested reforms. The recommendations themselves are temperate with respect to economic considerations did not reign supreme in the judgments of the Committee, but were one of several considerations in the making of the report’s contention (paragraph 48) that “it is at least possible in today’s circumstances that less dependence on energy and more on labor may on both counts have considerable advantages.”

The Committee made five major recommendations regarding veal calves: 1) The Minister of Agriculture should seek European Community agreement to measures which will bring an early end to the rearing of veal calves in crates, and is asked to report his progress in January 1982; 2) the Minister should try to convince consumers of the advantages of veal from loose-housed calves and should encourage labelling of the product indicating method of production; 3) no grants of any kind should be made to facilitate production of veal from calves kept in crates; 4) the revised Code of Recommendations should strongly discourage crate-rearing and prescribe pens that allow calves freedom of movement and have bedded floors; 5) it should be provided by Regulation that all calves be given access to solid feed after the age of two weeks.

For pigs, the Committee recommends that efforts be made to develop practical and economical alternatives which would allow for phasing out of the close confinement of pregnant sows, that government support this research and that no grants be given to producers using close-confinement methods. Further, the Code of Recommendations should state that pigs housed indoors have access to a bedded area and that efforts be made to relieve the frustration and boredom of stalled and tethered sows. Pigs should not be kept in total darkness. Tail docking, when unavoidable, should be performed by a veterinarian or specially-skilled operator only. The welfare of early-weaned piglets and alternatives to the currently most acceptable methods of housing farrowing sow indoors with warm creep areas for piglets should be subjects for further research. Finally, a ban on castration, except for veterinary reasons, should be sought within the European Community and imports from sources not adhering to the ban prohibited.

Another major recommendation involving the entire European Community (EC) asks for a statement of intention that in approximately five years, egg production will not include the use of battery cages in their present form (our emphasis). Further research should continue into alternative housing systems and in the meantime, the Minister should seek EC agreement to a minimum standard for battery cages of 750 sq cm per adult bird. The Committee proposes that a Regulation be written to prohibit peak-trimming except when it would be in the animal’s interest and then only under veterinary supervision. The practice of withholding food and water from birds for more than 24 hours should be discontinued.

The philosophy behind these recommendations, and the more general ones urging that the U.K. take a leading role in improving farm animal welfare, that state inspections be stepped up and that the Farm Animal Welfare Council play a bigger part in government research programs, was made explicit by the Chairman in a statement to the press: “We have tried, in short, to be realistic. We respect the views of those who would put welfare unconditionally first whatever the consequences, but we cannot go all the way with them. Neither, though, can we go along with the witness who told us uncompromisingly that consumers should not “have to pay higher prices for happy hens.” Above all, we do not accept that a practice should be allowed until it can be scientifically proved beyond all doubt to cause suffering. That would make indelible delay too easy. We have tried to strike a balance. We say firmly that above doubt should go to the animals.”

The full report, entitled Animal Welfare in Poultry, Pig and Veal Production (House of Commons Paper 406-I), is available for £4.90 from Her Majesty’s Stationery Office, London, UK.

Bill to Ban Decompression in Pennsylvania

Senator J. Doyle Corman of Pennsylvania (R—34th district) is introducing a bill which would ban the use of the high-altitude decompression chamber in that state. This method of euthanasia for dogs and cats, heavily criticized as inhumane, is already banned in the following nineteen states: Alabama, Arizona, Arkansas, California, Connecticut, Idaho, Kansas, Maine, Maryland, Massachusetts, Michigan, Nevada, New York, Ohio, Oklahoma, South Carolina, Tennessee, Virginia and Wyoming.

Trans-Species Unlimited, an animal rights organization in State College, Pennsylvania, initiated the campaign to ban the decompression chamber and drew up the bill which would effect the ban and regulate the use of alternative methods, i.e., sodium pentobarbital injection or carbon monoxide poisoning. According to the organization’s president, George George, the bill’s sponsor, the Trans-­Species Unlimited of all shelters in Pennsylvania revealed that sodium pentobarbital injection is already the most widely used method of euthanasia. The bill gives preference to this method as the most humane and specifies that all puppies and kittens under six weeks of age be euthanized only by injection of sodium pentobarbital. The bill further states that only a licensed veterinarian or technician certified as competent by a licensed veterinarian may administer the drug. If carbon monoxide is to be used, it must either be supplied from cylinders, or if from another source such as an automobile engine, cooled and filtered prior to administration.
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The philosophy behind these recommendations, and the more general ones urging that the U.K. take a leading role in improving farm animal welfare, that state inspections be stepped up and that the Farm Animal Welfare Council play a bigger part in government research programs, was made explicit by the Chairman in a statement to the press: "We have tried, in short, to be realistic. We respect the views of those who would put welfare unconditionally first whatever the consequences, but we cannot go all the way with them. Neither, though, can we go along with the witness who told us uncompromisingly that consumers should not "have to pay higher prices for happy hens." Above all, we do not accept that a practice should be allowed until it can be scientifically proved beyond all doubt to cause suffering. That would make inordinate delay too easy. We have tried to strike a balance. We say firmly that where doubt exists the benefit of that doubt should go to the animals."

A symposium entitled “Alternatives to Intensive Husbandry Systems” was held July 13-15, 1981 in Kent, England by the Universities Federation for Animal Welfare. Speakers presented a number of valuable papers that explored alternative systems of animal husbandry and provided cost/benefit comparisons of such alternatives to current confinement systems of livestock production.

Margaret Perry (Harper Adams Agricultural College, Shropshire) presented detailed observations of the behavior of free-range sows during farrowing. She reported that aggressive, hierarchical fighting is greatly reduced if the sows are introduced well before their first service as gilts, so that all contests to establish hierarchy may be settled before conception. Aggression related to social dominance, which appears at feeding time, may also be minimized by widely distributing the feed or providing the animals with separate feeding areas, or, alternatively, with feeding cubicles or pens. Near the time of farrowing, all sows showed nest building behavior to varying degrees, such behavior having not been altered or eliminated despite many generations of domestication. The sows were allowed to eat the placenta. Interestingly, under these free-range conditions and in the absence of any protective rails, the death rate of piglets, from having been laid upon by the sow, rarely exceeded 10% during the first week. Perry emphasized the importance of selecting for free-range farrowing sows with a strong mothering instinct, such as is seen in the saddleback cross. Perry made the important point that under free-range conditions, parturition is rapid, while for sows in farrowing crates, parturition is usually prolonged. Prolonged parturition results in a higher incidence of intra-partum stillbirths due to anoxia. Other problems associated with confinement farrowing units were also discussed. The heated creep areas often used to keep the piglets warm may be an unnecessary expense, as the sow’s udder is able to provide all the needed warmth. The sow’s ability to create a suitable micro-climate by building a nest would also seem to preclude the need for supplemental heat. Another problem cited was the inability of confined sows to get away from their litters, resulting in oversuckling, which can lead to intestinal problems in the piglets.

H.S. Hawkins (Baxter Parker Ltd., King’s Lynn) presented a paper on the outdoor breeding, rearing and finishing of swine. The statistics compiled by Hawkim’s company clearly reveal the economic viability of free-range swine production. The company has some 2,000 breeding sows and produces 38,000 pigs per year. It also maintains a production unit of 350 sows and thus had reliable economic figures for comparison. Feed consumption was only slightly higher on the extensive unit: 1.37 tons sow feed/ year compared to 1.28 tons/year on the intensive unit. Consumption for weaned pigs was identical: 600 kg feed/25 kg weaner sold at 8-10 weeks of age. Intensive units have higher labor costs as more time is spent cleaning out, washing down, etc. The labor cost per year for the intensive unit was £48,123 compared to £39,789 for the extensive system. Veterinary costs were greater under the intensive system: £25.38 per sow per year compared to £22.20 per sow per year under the extensive system. The difference in veterinary costs can be attributed to the lower incidence of respiratory disease under extensive conditions. Energy expenditures per year under the intensive system were almost £7,000 per year for the intensive unit, while the cost of providing gas for creep heating in the extensive unit was £2,500. Tractor and van costs, including fuel, were £3,805 higher on the extensive unit. With sundry costs such as rent and water figured in, overall operating costs are about £6,000 per year higher for the intensive unit. Productivity for both units compared very closely. With both systems producing 20 pigs/sow/year, the annual increase produced on the extensive unit was 63 pence lower than on the intensive unit. Hawkins concluded by stating that the selection of a suitable soil type to ensure good drainage (ideally, sand or gravel on a chalk substrata), good stockmanship and careful keeping of performance records are the necessary elements in a profitable extensive pig-breeding operation.

A. Stolba (Edinburgh School of Agriculture) presented an interesting paper entitled “A family system in enriched pens as a novel method of pig housing,” in which various husbandry systems were compared with the housing of pigs in an enriched, complex environment. The theoretical basis for these studies is the recognition of the need for qualitative improvement in the environment, with the provision of key stimuli specific to the behavioral requirements of the species. Four families of sows and their offspring were housed in a system which provided for nesting and rooting and included a corridor connecting the neighboring pens. Various structures such as partitioning walls, headfeeding stalls, farrowing rails and rubbing posts were present. The main substrate was straw, while heat was provided in the rooting area. Details of behavioral differences between sows kept under conventional and these more enriched conditions were described. One interesting conclusion drawn was that the less enriched the environment, such as when housing is minimally structured, the more behavior is redirected away from the physical environment and toward other pigs (see Sambraus, Int J Stud Anim Prob 23(5):245-248, 1981). A significant overreaction toward novel objects was also demonstrated in gilts kept under the more impoverished conditions. It was also found that stereotypes in stalled sows increased with the number of littermates farrowed. Among sows housed together in more enriched environmental conditions, very distinct social bonds developed, with a significant reduction in aggressive behavior, even to the point of sharing of nests between sows having litters. Under the system described above, piglet mortalities during the farrowing period were greatly reduced in comparison to conventional systems. Virtually all losses occurred at an earlier stage in the life of the piglets. Weaning occurred naturally between the 10th and 15th week during the winter months, the faster-growing pigs reached market weight for bacon at 145 days. A second group was slaughtered at 156 days, and the slow growers at 170 days.

A boar was introduced while the sows were still lactating, with pregnancy resulting before weaning of the preceding litter. In the family pens, where sows and litters are housed together from birth to slaughter and pigs are never shifted or mixed, the fattening time was shortened by 20 days. Although this family system is only in the experimental stage, the producers obtaining results to date are promising, according to Stolba. The system’s primary assets are good fattening performance and the encouraging prospect of mating during lactation, which renders early weaning, with all its implications for welfare, obsolete. Since mating occurs early in the lactation, with the boar being introduced to the group 20 days after farrowing, more litters can be produced (2.3 litters per year in this case). There are also prospects of shortening the cycle even more. Under this system, sows must be fed on a high level of nutrition before mating. For growing pigs, food intake and conversion seem to be similar to conventional systems. This study clearly shows how basic ethological research on domestic animals can contribute significantly to the applied design of housing conditions appropriate to a species’ behavior.

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Current Events

MEETING REPORTS

Alternatives to Intensive Husbandry

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Professor D.W. Sainsbury (University of Cambridge) presented a paper based on his study of the covered strawyard system for the production of eggs from
laying hens. The covered strawyard is a simple covered shed, uninsulated and naturally ventilated, but which nonetheless provides good protection from the weather. It is a single-fronted monopitch house, approximately 20 ft deep with the open side facing south. The floor is deeply strawed, about 1 ft deep, and provides about 3 sq ft for each bird. The house contains laying boxes of 5 birds/box, hanging feeders and drinkers, and moveable perch units for roosting. Artificial lighting is provided to boost winter egg production. Significantly, Sainsbury reported that production is virtually the same for the cage and strawyard systems, but food consumption has been lower in the strawyard system. Operating costs are minimal, as there are no fans or other mechanical equipment. The straw is an expense, but as Sainsbury pointed out, it helps make a valuable manure. Eggs can be kept clean if the litter is properly maintained. A disadvantage of the strawyard system is that it requires more skill and care to operate than the cage system. Sainsbury concluded that while the system is not likely to be one favored by large operators, it does fit ideally into the mixed farm system.

Arnold Elson (Agricultural Development and Advisory Service, Shardlow, Derbyshire) discussed various modifications of existing battery cage systems designed to improve the overall welfare of laying hens. Elson reviewed the work of Tauson in Sweden, who has made several modifications of commercial battery cages. These improvements were to reduce trapping, abrasion, and injury to the hens. Significant improvements have been made and incorporated into operations. Elson also gave an update of research on the “get-away” cage system. The get-away cage provides vertical, as well as horizontal, space for birds by the inclusion of perches, feeding and drinking units at multiple positions, nest boxes, and dust baths. The provision of perches in cages has significantly improved foot conditions in heavy birds. However, research on the get-away cage has been suspended because of several problems. Notably, eggs were laid on the cage floor outside the nest boxes. Eggs were dirty, birds were contaminated with manure from those perching above, and feed intake was higher than in conventional cage systems. Research on the cage design is continuing in other European countries, where further modifications have been implemented. One such modification is a sloping floor, which enables the eggs to roll outside of the nest boxes to a collecting area, thus avoiding contamination by fecal material. Separate dust baths have also been provided in an attempt to dissociate dust-bathing and nesting and thus reduce the contamination of nest boxes and eggs. Some success has resulted from these modifications although several problems still remain. Elson concluded that while the get-away cage does widen the bird’s behavioral repertoire, it is not yet certain that it is practically and commercially viable.

Amanda Hill (Ministry of Agriculture, Fisheries and Food, Gleadthorpe) provided an in-depth discussion of aviary systems for laying hens. The aviary system is similar to a conventional litter or wire floor system, differing only in the addition of extra floors of wire or slats. The feeders, drinkers, and nest boxes are provided on each of the floors and the various levels are connected by ladders. The provision of extra flooring allows the stocking density to be increased beyond that obtained under a conventional litter system. This reduces the capital cost per bird housed and provides a warmer house temperature. The additional ventilation afforded by the extra body heat of more birds improves the environmental quality by reducing condensation, lowering ammonia levels, and improving litter conditions. Hill described a number of problems encountered, among them differences in adaptability between strains and the necessity of relocating nest boxes in order to encourage birds to use the boxes for laying. Regardless of nest type, the single tier of nest along each side wall was found to be more popular than any single tier of central nests. The reasons for this remain obscure. Further research is needed to elucidate why some birds are reluctant to use nest boxes. The need for higher feed intake requires exploration although this could be attributed to excessive waste of food in the aviary, which could be reduced by redesigning the type of feeding system. Ammonia levels still tend to be unacceptably high; it is hoped that further research will remedy this problem. Hill emphasized that these studies are preliminary and intended to investigate only the practicalities of the aviary system. No attempt has been made to assess whether the system improves the welfare of the hens and is economically viable.

Paul Carnell (Earth Resources Research Ltd, London) discussed the feasibility of conducting an economic appraisal of less intensive systems in egg production and the breeding of swine. A major problem in the dearth of information on costs and performance of poultry and swine under nonconfinement conditions. Further research is needed on developing alternative systems before an in-depth and meaningful economic appraisal can be made. In spite of these limitations, Carnell presented a valuable comparative analysis, especially of alternatives to the battery cage system. He pointed out that a Gallup Poll conducted in England in September 1980 showed that 60% of the consumers would be willing to pay more for nonbattery eggs. According to Carnell, his own studies demonstrate that the commercial advantages of intensive systems may not be as marked as is often assumed. This is particularly true with swine practices, as reflected in the coexistence of a wide range of husbandry methods still being used in swine production. In egg production, Carnell concludes that the advantages of battery cages are minimal in relation to intensive indoor flock systems and it is likely that a significant commercial niche exists even for more extensive production systems. Carnell also pointed out that despite the results of the Gallup poll, consumers generally do not want higher prices. However, price is only one consideration affecting choice. Quality and acceptability of an alternative system are further considerations. As avian producers have learned in the U.K. from the widespread public rejection of veal raised in confinement, the consumers must be well-informed to be able to choose effectively. It is difficult, however, to make informed choices at the marketplace when there is inadequate and sometimes misleading labeling. This is particularly true of “free-range” eggs, which may not, in fact, be the product of hens raised under optimal free-range conditions.) Carnell emphasized that swine and poultry production have become increasingly competitive, with the profit margin per animal narrowing considerably. Consequently, small changes in costs or performance with only marginal implications for consumer prices have a more substantial impact upon producers’ profits. Carnell made the important point that the labor requirement for less intensive systems is greater, and skilled stockmen are difficult to find. Thus, farmers who wish to minimize dependence upon nonfamily labor are likely to find more attractive systems that substitute capital for labor. Related to this is the fact that less intensive systems present a greater challenge to good stockmanship and management. There are fewer environmental controls, mechanical aids and constraints upon the behavior of livestock. More demands are made upon the skill and judgment of the farmer, and thus the economic penalties for poor management may prove more serious under nonintensive systems. — M.W. Fox

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First European Symposium on Poultry Welfare

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laying hens. The covered strawyard is a simple covered shed, uninsulated and naturally ventilated, but which nonetheless provides good protection from the weather: it is a large-fronted monopitch house, approximately 20 ft deep with the open side facing south. The floor is deeply strawed, about 1 ft deep, and provides about 3 sq ft for each bird. The house contains laying boxes of 5 birds/box, hanging feeders and drinkers, and moveable perch units for roosting. Artificial lighting is provided to boost winter egg production. Significantly, Sainsbury reported that production is virtually the same for the cage and strawyard systems, but food consumption has been lower in the strawyard system. Operating costs are minimal, as there are no fans or other mechanical equipment. The straw is an expense, but as Sainsbury pointed out, it helps make a valuable manure. Eggs can be kept clean if the litter is properly maintained. A disadvantage of the strawyard system is that it requires more skill and care to operate than the cage system. Sainsbury concluded that while the system is not likely to be one favored by large operators, it does fit ideally into the mixed farm system.

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First European Symposium on Poultry Welfare

A Symposium on Poultry Welfare convened by the Danish Branch of the
The Conference was divided into four Topics: (1) The Measurement and Interpretation of Behavior Observations; (2) Effects of Technical Modifications and Induced Moulting; (3) Choice of Production Systems for Egg-layers; (4) Amelioration of Behavioral Observations and Induced Moulting.

Each Topic occupied a one hour session during which 3 or 4 technical papers were presented on various aspects of the Topic under discussion. The papers were of a high standard. The first session contained contributions from Dr. R. van den Berg of the Netherlands, Professor Wegener of Germany, and Dr. Jensen of Denmark. Dr. van den Berg spoke on "Telemetry," and by Dr. Jensen, "Welfare Aspects Related to Number of Laying Periods" by Dr. Simonsen, "The Anatomy of the Beak" by Dr. Gentle, and "The Effects of Beak Trimming" by Dr. Eske-land. Dr. Gentle demonstrated that there were important taste buds and numerous sensory receptors with an extensive nerve supply on the beak surface of both upper and lower beak. The bird's beak serves not only to grasp and manipulate food particles prior to ingestion but is also used as a tool in nesting behavior, exploration, drinking, preening and as a weapon in aggressive encounters. To deprive the bird of part of its "beak" or "beak trimming" is not only found to be painful but will radically alter the bird's behavior and the quality and quantity of sensory input that the bird may enjoy with an intact beak. Dr. Gentle believed that the bird had a unique ability to react to the change in the environment. Dr. Eske-land sought to show that beak trimming increased egg production and improved food conversion ratio. This assertion was not accepted by some of us who believed that what he had demonstrated was not a better food conversion ratio but a smaller egg or food wastage. If such is true there is surely need to redesign the structure of the egg rather than to redesign the bird.

Apart from the scientific sessions there was an enjoyable hiatus on the second day devoted in the morning to a visit to the Tybjerg Central Poultry Farm to witness "beak trimming" and a visit to the farm to tour of Tybjerg's hatchery and rearing units. After this came a visit to the Tylese family farm where 6000 hens were kept in a plywood floor house. These birds had been 86 weeks in lay—and showed it! Then on to a Forest Inn for something as far removed from an English pub-lunch as I can imagine—gargantuan might be the word to describe it.

Although the Conference was billed as a Poultry Welfare Conference, one sensed that the underlying reasons for us all being there were economic and political. A few years ago Denmark exported 60% of her egg production. Now she produces only enough for her own needs. The Danish producers blame unfair competition insofar as they have hitherto been prevented by law from using the most profitable methods for producing eggs, i.e., the battery cage. They wish to get on equal terms with their Continental competitors applying the same rules and conditions, which must be agreed upon and promulgated by the Commission. The Commission, under pressure from Germany and no doubt supported by other EEC governments, wishes to "legitimize" the German animal welfare law of 1972 and can only do this by supplanting national legislation by EEC directive. It remains to be seen what happens when the EEC representatives who were present at the Conference report back to their masters.

Philip Brown
Chief Veterinary Officer Royal Society for the Prevention of Cruelty to Animals

FORTHCOMING MEETINGS

American Association for the Advancement of Science: Annual Meeting, January 3-8, 1982, Washington, DC.
World’s Poultry Science Association was held in Koge, Denmark June 9-12, 1981.

The meeting was attended by close to 600 delegates mostly from Europe but including several from the United States and Canada. The program was divided into four Topics: (1) The Measurement and Interpretation of Behavior Observations; (2) Effects of Technical Features on Welfare; (3) Choice of Production Systems for Egg Layers; (4) Anatomical Modifications and Induced Moulting.

Each Topic occupied a one hour session during which 3 or 4 technical papers were presented on various aspects of the Topic under discussion. The papers were presented on various occasions and recommendations in many cases of questions were formulated. The plenary group then read out the conclusions and reported back to their masters.

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ANNOUNCEMENTS

$1 Million for Alternatives

The Cosmetic, Toiletry and Fragrance Association (CTFA) has given a grant of $1 million to the Johns Hopkins University School of Hygiene and Public Health (Baltimore, Maryland) to establish a Center for Alternatives to Animal Testing. Dr. Alan Goldberg, a toxicologist who has worked with in vitro techniques, will serve as director of the new laboratory. The grant provides for basic research; according to a New York Times article quoting Dr. Goldberg (23 September 1981), the laboratory will not conduct "chemical-specific tests" for the cosmetics industry, but instead will "seek to perfect a broad new system of testing for irritation and inflammation by using cell cultures and studying changes in cell structure." Recent campaigns by humane societies in conjunction with activist Henry Spira to abolish the Draize irritancy test, which has been widely criticized as both inhumane and inaccurate, have focused on the highly profitable cosmetics industry, specifically in the form of the suggestion that the industry contribute money to research on alternative methods of product safety testing.

Elsevier Drops ARS

Animal Regulation Studies, a quarterly journal "reporting on advanced work in animal control and welfare," will cease publication after 1981. Sponsored by the World Federation for the Protection of Animals and published by Elsevier, a commercial concern headquartered in the Netherlands, Animal Regulation Studies was launched in 1977 with the expressed intent of presenting "original studies, reviews and exchanges of views designed to increase the knowledge necessary for improving man-animal relationships and for moderating abuses caused by man's exploitation of animals" (Anim Regul Stud 1:1: inside cover, 1977).

New Animal Rights Group

Trans-Species Unlimited is a recently formed animal rights organization composed of concerned individuals who are determined to put an end to the exploitation, abuse, and slaughter of non-human animals. We believe that the various species of sentient creatures on earth constitute a single, complex, interconnected, and mutually dependent web of life, and that this web is not part of, nor apart from, or in dominion over, this biological network. We believe further that the infliction of unnecessary suffering or death on sentient creatures is morally wrong and that they have a moral right to exemption from such treatment. We reject as specistically sentimental and human self-interest as the ideological foundation of animal rights and deny that there is any fundamental conflict between legitimate human and nonhuman animal interests. We seek to realize our ends through educational, persuasive, and legal means, and where necessary, through direct but nonviolent action. For further information write to:

Bibliography on Animal Rights

University Press of America has published A Bibliography on Animal Rights and Related Matters by Charles R. Magel, a professor of philosophy at Moorhead State University. The publisher describes the book as follows: "Essentially concerned with animals and ethics, this volume includes works on rights in the technical sense of "moral, natural and legal rights," entries on obligations and duties to animals, the moral status and just treatment of animals, and any kind of moral constraints on human treatment of animals. Entries which deny animals moral status are also included. The bibliography is restricted to literature in the English language, with over 3,200 entries; it is also confined to the thought and practices of the Western world, from Biblical times to 1980." Price: $28.50.
A symposium entitled “Alternatives to Intensive Husbandry Systems” was held July 13-15, 1981 in Kent, England by the Universities Federation for Animal Welfare. Speakers presented a number of valuable papers that explored alternative systems of animal husbandry and provided cost/benefit comparisons of such alternatives to current confinement systems of livestock production.

Margaret Perry (Harper Adams Agricultural College, Shropshire) presented detailed observations of the behavior of free-range sows during farrowing. She reported that aggressive, hierarchical fighting is greatly reduced if the sows are introduced well before their first service as gilts, so that all contests to establish hierarchy may be settled before conception. Aggression related to social dominance, which appears at feeding time, may also be minimized by widely distributing the feed or providing the animals with separate feeding areas, or, alternatively, feeding cubicles or pens. Near the time of farrowing, all sows showed nest building behavior to varying degrees, such behavior having not been altered or eliminated despite many generations of domestication. The sows were also induced to eat the placentas. Interestingly, under these free-range conditions and in the absence of any protective rails, the death rate of piglets, from having been laid upon by the sow, rarely exceeded 10% during the first week. Perry emphasized the importance of selecting for free-range farrowing sows with a strong mothering instinct, such as is seen in the saddleback cross. Perry made the important point that under free-range conditions, parturition is rapid, while for sows in farrowing crates, parturition is usually prolonged. Prolonged parturition results in a higher incidence of intra-partum stillbirths due to anoxia. Other problems associated with confinement farrowing units were also discussed. The heated creep areas often used to keep the piglets warm may be an unnecessary expense, as the sow’s udder is able to provide all the needed warmth. The sow’s ability to provide a suitable micro-climate by building a nest would also seem to preclude the need for supplemental heat. Another problem cited was the inability of confined sows to get away from their litters, resulting in oversuckling, which can lead to intestinal problems in the piglets.

H.S. Hawkins (Baxter Parker Ltd., King’s Lynn) presented a paper on the outdoor breeding, rearing and finishing of swine. The statistics compiled by Hawkins’ company clearly reveal the economic viability of free-range swine production. The company has some 2,000 breeding sows and produces 30,000 pigs per year. It also maintains a production unit of 350 sows and thus had reliable economic figures for comparison. Feed consumption was only slightly higher on the extensive unit: 1.37 tons sow feed/ year compared to 1.28 tons/year on the intensive unit. Consumption for weaned gilts was identical. 1.0 kg feed/25 kg weaner sold at 8-10 weeks of age. Intensive units have higher labor costs as more time is spent cleaning out, washing down, etc. The labor cost per year for the intensive unit was £48,123 compared to £39,789 for the extensive system. Veterinary costs were greater under the intensive system: £25.38 per sow per year compared to £22.20 per sow per year under the extensive system. The difference in veterinary costs can be attributed to the lower incidence of respiratory disease under extensive conditions. Energy expenditures were almost £7,000 per year for the intensive unit, while the cost of providing gas for creep heating in the extensive unit was £2,500. Tractor and van costs, including fuel, were £3,805 higher on the extensive unit. With sundry costs such as rent and water figured in, overall operating costs are about £6,000 per year higher for the intensive unit. Productivity for both units compared very closely. With both systems producing 20 pigs/sow per year, the hogs produced on the extensive unit was 63 pence lower than on the intensive unit. Hawkins concluded by stating that the selection of a suitable soil type to ensure good drainage (ideally, sand or gravel on a chalk substrate), good stockmanship and careful keeping of performance records are the necessary elements in a profitable extensive pig-breeding operation.

A. Stolba (Edinburgh School of Agriculture) presented an interesting paper entitled “A family system in enriched pens as a novel method of pig housing,” in which various husbandry systems were compared with the housing of pigs in the peripartum, complex environment. The theoretical basis for these studies is the recognition of the need for qualitative improvement in the environment, with the provision of key stimuli specific to the behavioral requirements of the species. Four families of sows and their offspring were housed in a system which provided for nesting and rooting and included a corridor connecting the neighboring pens. Various structures such as partitioning walls, headfeeding stalls, farrowing rails and rubber posts were present. The main substrate was straw, while heat was provided in the rooting area. Details of behavioral differences between sows kept under conventional and these more enriched conditions were described. One interesting conclusion drawn was that the less enriched the environment, such as when housing is closely stripped of structures, the more behavior is redirected away from the physical environment and toward other pigs (see Sambras, Int J Stud Anim Prob 2:125-24, 1981). A significant overreaction toward novel objects was also demonstrated in hogs kept under the more impoverished conditions. It was also found that stereotypes in stalled sows increased with the number of littermates farrowed. Among sows housed together in more enriched environmental conditions, very distinct social bonds developed, with a significant reduction in aggressive behavior, even to the point of sharing of nests between sows having litters. Under the system described above, piglet mortalities during the fattening period were greatly reduced in comparison to conventional systems. Virtually all losses occurred at an earlier stage in the life of the piglets. Weaning occurred naturally between the 10th and 15th week during the winter months, the faster-growing pigs reached market weight for bacon at 145 days. A second group was slaughtered at 156 days, and the slow growers at 170 days. A boar was introduced while the sows were still lactating, with pregnancy resulting before weaning of the preceding litter. In the family pens, where sows and litters are housed together from birth to slaughter and pigs are never shifted or mixed, the fattening time was shortened by 20 days. Although this family system is only in the experimental stage, the procedures obtained to date are promising, according to Stolba. The system’s primary assets are good fattening performance and the encouraging prospect of mating during lactation, which renders early weaning, with all its implications for welfare, obsolete. Since mating occurs latching with the boar being introduced to the group 20 days after farrowing, more litters can be produced (2.3 litters per year in this case). There are also prospects of shortening the cycle even more. Under this system, sows must be fed on a high level of nutrition before mating. For growing pigs, food intake and conversion seem to be similar to conventional systems. This study clearly shows how basic ethological research on domestic animals can contribute significantly to the applied design of housing conditions appropriate to a species behavior.

Professor D.W. Sainsbury (University of Cambridge) presented a paper based on his study of the covered strawyard system for the production of eggs from
HANDBOOK FOR THE ANIMAL LICENCE HOLDER, H.W. Wyatt, ed. (Institute of Biology, 41 Queens Gate, London SW7, 1980). This is a useful little publication which has been produced to aid and inform those who are conducting or wish to conduct animal research in the United Kingdom. The first chapter by Philip O'Donoghue, editor of Laboratory Animals, provides a clear and readily comprehended description of the legal and personal responsibilities of the animal experimenter. Dr. Michael Festing (MRC Laboratory Animals Centre) discusses the choice of the species to be used in research, and Dr. Wyatt addresses the question of the choice of the experiment. Finally, there is a list of relevant addresses, a glossary of terms and two tables summarizing the licensing requirements in the U.K.

While the publication is intended primarily for license-holders or applicants for a research license in the U.K., it could also be a useful publication for readers elsewhere. The format is convenient and neat and the information is sound. It is, perhaps, too utilitarian in flavor for the animal liberationist, but it does represent a welcome step in the right direction by the Institute of Biology. Presumably, it is the next stage following the Institute's recommendation that applicants for a license to do animal research be required to take a short course on animal handling and surgical techniques, including sections on the experimenter's legal and ethical responsibilities.—A.N. Rowan

BOOKS RECEIVED


DER BUNDESSTRAFRECHTLICHE TIER-SCHUTZ, Ueli Vogel-Ettene, Zürcher Studien zum Strafrecht, No. 6 (Schulthess Polygraphischer Verlag AG, Zurich, Switzerland).


WILDLIFE DISEASE RESEARCH AND ECONOMIC DEVELOPMENT, Lars Kastad, Barry Nestel, Michael Graham, eds. (International Development Research Centre, Box 8500, Ottawa K1G 3H9, Canada, 1981).

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