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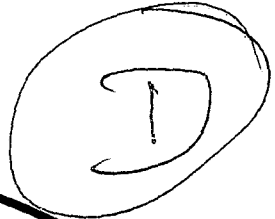
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# International Journal for the Study of Animal Problems

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# Letters

## Journal Editorial Vindicates Vivisectionists

M.W. Fox's editorial, "The 'Show Dog' Syndrome" (*Int J Anim Prob* 3(1):3, 1982) cannot help but be extremely upsetting to any person who wants to see the particularly sadistic and useless experiments involving sentient beings recognized as such. I am referring to Fox's reference to Overmeier's "learned helplessness" experiments involving intense unavoidable electrical shock administered to dogs. Through reference to these kinds of experiments, Fox lends credibility to them; it would seem there is no other way to understand the "show dog" syndrome from a scientific perspective. Fox therefore validates Overmeier's research and others who engage in similar research.

Surely more accurate, applicable results should be derived from studies that occurred "in situ": studies which looked at show dogs, at the adaptability of dogs that go through a lot of handlers versus that of dogs that always go to shows with their owners. (For anyone who attends dog shows, the difference is marked and obvious between dogs that are shunted about and dogs that are always attended by someone who cares about their interests.) Certainly, an "in situ" project is not as convenient as a lab setting and, I suppose, such a project would not even call for a vivisectionist. In fact, it appears that the "show dog" syndrome calls for an observation of "anthropomorphic" kinds of responses, that is, responses that we can recognize as having similar emotional roots as our own. Vivisectionists are not "into" observing and recognizing the sentience of sentient beings.

A further objection I have to Fox's use of such research, apart from lending credibility and validation to questionable work, is that I don't think Fox has demonstrated how Overmeier's experiments are anywhere near applicable to the "show

dog" syndrome. The "dependency" that a dog forms upon its human owner is surely not similar to a situation in which dogs of unknown origin (often unwanted dogs abandoned to the dog pounds) cannot avoid intense electrical shock and ultimately succumb to it. Can this even be called "dependency"? And does it have anything whatever to do with "relating" to other sentient beings?

I have been subscribing to *International Journal for the Study of Animal Problems* since its inception. As long as the *Journal* questions the most fundamental issues regarding the whole concept of vivisection (which ultimately question the "scientific principle" itself), I shall continue to subscribe. But, if the *Journal* becomes simply yet another vehicle for vivisectionists to publish and conclude with the usual "more research in this area is needed," I would not be able to, in conscience, contribute my money toward such goals. This magazine has appealed to both sectors (vivisectionists and anti-vivisectionists) thus far—but I am alarmed by the fact that Fox's editorial suggests that the magazine is taking a new and disturbing direction.

Pat Allan  
President

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## Dr. Fox Responds

I have never condoned studies of learned helplessness in animals that entail great physical and psychological trauma—such as 5 milliamperes of inescapable electrical shock repeated at intervals for several days, and I have severely criticized psychologists (Fox, 1981) for such poor experimental design and needless repetition. You clearly overlooked my stating in my editorial that

such experiments are ethically questionable. I also find them morally repugnant and wonder about the state of mind of those doing such experiments. Even so, such research is of value (and that's why I cited Overmeier's book) in convincing those who in treating animals as unfeeling things (and treating show dogs like mere objects) can cause unnecessary suffering. Why? Because it is only objective, "controlled laboratory data" that will convince them that animals are sentient. I therefore cite such research not to give it credibility, but to further the understanding of animals by those "Cartesian mechanists" who have a limited ability to empathize, do not believe animals have emotions or a subjective world of their own (Griffin, 1981) and who can only believe "objective" data.

#### References

- Fox, M.W. (1981) Experimental psychology, animal rights, welfare and ethics. *Psychopharmacol Bull* 17: 80-84.
- Griffin, D.R. (1981) *The Question of Animal Awareness*. Rockefeller University Press, New York, NY.

Michael W. Fox  
Associate Editor

### Behavior Inconsistent with Attitudes?

I welcome John and Valerie Braithwaite's survey on "Attitudes Toward Animal Suffering" (*Int J Stud Anim Prob* 3(1):42-49, 1982) as a good beginning in establishing a much-needed empirical basis for discussions of the issue. Their selection of survey items is exceptionally well designed, in that it provides for a systematic comparison of attitudes across relevant values of several important variables.

However, in my opinion the Braithwaites' analysis of the data obtained reflects a mistaken assumption that one can infer behavior from written responses to a questionnaire. They note the inconsistencies revealed by the findings, that while 90% of the respondents disapproved of "the use of inhumane killing methods at an

abattoir," only 41% disapproved of the practice of eating the meat from such abattoirs; and that while 73% disapproved of force-feeding geese to produce paté, only 46% disapproved of eating the paté. They conclude from these and other findings that their study "raise[s] the question of whether more fruitful avenues for future research might lie in exploring the structure of the inconsistencies between attitudes and behavior [emphasis in original], rather than in further analysis of the structure of attitudes alone." Further, they state in their abstract that "The results, though preliminary, strongly suggest that attitudes may be in great part supportive of animal welfare and animal rights. However, as reflected in the answers to the questionnaire, actual behavior does not always follow suit."

The Braithwaites are certainly correct about behavior not always being consistent with expressed attitudes, but their survey data do not show this. Rather, the data indicate that people have different attitudes about different behaviors: killing and eating. Perhaps this reflects differences in attitudes about what others should do and what is permissible for oneself to do (others have the job of killing animals in abattoirs; everyone has the option of eating meat); or maybe the issue is an unwillingness to take moral responsibility for an act already committed ("I might as well eat it since the harm is already done"), or a feeling that an individual boycott would be futile. At any rate, attitudes about behavior—either the behavior of killing or that of eating—are not the same thing as the behavior itself. It would be interesting to know whether the 46% who disapproved of eating paté would actually refrain from eating it at a dinner party; only that kind of information would show if there is an inconsistency between attitude and behavior, as the Braithwaites claim there is.

I would like to make one other comment about this study. The Braithwaites' brief analysis of the data presented in the accompanying table does not mention some very interesting aspects of

these findings. One significant point is that the painfulness of the research emerges as by far the most important criterion in respondents' disapproval. Of the other three variables examined, the species of animal and the purpose of the experiment also make a significant difference, but whether or not the research involves killing the animal is given relatively little weight by respondents. Respondents tended to disapprove of painful research regardless of its medical benefits (if the research was described as painless, then the purpose of the research gained importance dramatically as a criterion). Likewise, respondents

tended to disapprove of the non-medical use of research animals regardless of its painlessness (if the research was medical, however, then the pain criterion gained in importance.)

Among Australian college students, at least, it would seem that the traditional justification of animal research in terms of its medical benefits to humans will have little effect unless the issue of pain is also addressed.

Mary T. Phillips  
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# Editorials

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## The Issue of Science and The Issue of Care

A.N. Rowan

Dr. Edward Taub, Director of the Behavioral Biology Center of the Institute for Behavioral Research was, on November 23, 1981, found guilty of 6 counts of cruelty to animals. Dr. Taub has cried "victimization" and has attempted (with some success) to rally researchers to his defense. However, scientists should beware of taking up this case as a cause *celebré*. Taub was *not* being tried because his research was cruel (and hence unjustified); he was being tried because his laboratory was grossly unsanitary and because he did not provide adequate veterinary care. According to one respected laboratory animal veterinarian, the conditions were "atrocious," and the cages depicted in the police photographs looked as though they had not been cleaned properly for 3 months or more.

Dr. Taub and his supporters do their cause no good when they argue that the primate facilities at IBR are no worse than the primate facilities at other institutions. The facilities at all the institutions I have seen do not have rodent feces lying in moldy piles on the floor, nor is there extensive caking of fecal material on the cages, and there is no broken cage wiring protruding into the living area of the animal.

In the final analysis, the case turned on whether or not the monkeys received adequate veterinary care. Dr. Taub argued that deafferentated monkeys have very special needs and that only he and a handful of other specialists in the field know how to take care of them. Perhaps this is why no veterinarian saw the monkeys during the 2 years preceding their

confiscation. Dr. Taub, who has no veterinary training, was forced to admit in court that he could not have diagnosed the osteomyelitis found in one animal, which later forced NIH veterinarians to amputate the limb to prevent the condition from spreading.

The question of whether or not the deafferentated limbs should be bandaged if they develop lesions was also a matter of controversy. Dr. Taub, according to his own published work, used to advocate bandaging but, within the last few years, had apparently decided that it was better to let wounds and the stumps of bitten-off fingers heal by themselves. However, he would still use bandages, as the photograph of one filthy and rotting bandage on an IBR monkey limb indicated. In this case, was there some special reason for breaking with his new-found belief that bandaging deafferentated limbs was bad, or was he still so ambivalent about the practice that he would sometimes apply bandages and sometimes not?

In addition, Dr. Taub does not appear to have been very creative in attempting to deal with the problem of care for deafferentated monkeys. Some researchers have used Elizabethan collars to prevent the animals from placing their arms in their mouths. However, such collars need to be properly padded and fitted to prevent the development of pressure sores, and the cages have to be large enough to accommodate them.

Another possible preventive measure is padding of the cages. Several of Taub's monkeys either had broken bones or showed evidence of earlier fractures. These do not occur because the animal



bites its arm; they happen because the animal catches the arm in some part of the cage. Cages could be modified to prevent this without too much trouble. The IBR cages had no such modifications—instead many had broken wires, some of which protruded into the living area of the cage.

Dr. Taub could also have considered the possibility of pulling the canines of the monkeys (and perhaps even the incisors) as a possible means of preventing serious self-mutilation. Of course, such a course of action in itself raises new questions about animal welfare but, in this case, it may have been better for the overall welfare of the animals to perform the operation.

In the final analysis, we have no doubt that the conditions under which the animals were kept, conditions that had been documented in 1977 (by the USDA and the NIH) and then again in 1981, were totally unacceptable. The scientist's responsibility to provide the best possible care for the animals that

are used in biomedical research was definitely not met.

Other scientists who perceive this case as a threat to the whole process of laboratory experimentation will not help the growing debate over ethical issues in animal research if they rush to defend the conditions at IBR. In the final analysis, the intentions or affiliation of Pacheco, the whistle blower, are irrelevant. Even without his testimony and his photographs, evidence given by the police and other witnesses clearly demonstrates that the care and sanitation were well below professionally accepted standards. And it is not only animal welfare supporters who feel this way. One practicing research scientist, with extensive experience in research on primates, has stated to me that: if this, in fact, represents the current standard of medical research in this country, then it should be stopped.

*(The details of the case, with relevant background material, are given elsewhere in this issue of the Journal).*

## The Slippery Semantics of a Word: "Dominion"

M.W. Fox

The word "dominion," which is interpreted by many as equivalent to "domination," is defined primarily (in Webster's dictionary) as indicating "sovereignty." *Roget's International Thesaurus* interprets dominion as "realm, domain or jurisdiction" and therefore makes "dominion," "domination," "sovereignty," and "supremacy" synonymous. Thus, the passage in Genesis 1:26 that proclaims that man has "dominion over the fish of the sea, and over the birds of the

air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth," can be interpreted as meaning that he has been granted sovereignty, jurisdiction, or domination. The passage does not state, however, to what degree humans, as dominionists or sovereigns, may exploit the rest of creation: no ethical limits are set. Thus, the term "dominion" is ambiguous insofar as it does not denote to what degree humans, as dominionists or sovereigns, may

exploit the rest of creation. But in other parts of the Bible there are very clear injunctions to "dress and to keep" the earth, to treat animals humanely, and to rest beasts of burden on the Sabbath.

Therefore, while there is ambiguity in the use of the word "dominion" in the context of the Genesis passage, interpretation of "dominion" as domination or license to exploit animals — for whatever purpose — becomes impossible when the passage is placed beside the many injunctions in the Bible that advise us to treat animals with kindness; the idea of

domination can be seen as heretically and hubristically self-serving. In this edition of the *Journal*, J.A. Rimbach reviews Old Testament and post-biblical Jewish literature, which reveals clearly that the teaching of reverence for life is an integral part of the Judeo-Christian tradition. Furthermore, evidence is clearly presented to show that any narrow interpretation of the word "dominion" as meaning "domination" is both incorrect and contrary to the essence of the Judeo-Christian tradition.

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# News & Analysis

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## **Pound Animals for Research Institutions?**

Ever since the first animal procurement (pound seizure) laws were passed in the late 1940's and early 1950's, the question of the use of pound animals by research institutions has raised passionate opposition from humane societies and other animal welfare groups. In the 1950's, the public apparently favored the practice, judging by votes in Los Angeles and Baltimore, but there are signs that opinion has begun to shift in the 1980's. For example, groups have been fighting to repeal the Metcalf-Hatch Act in New York for many years, but it was not until 1979 that they were successful. One year later, a new Connecticut bill repealed the old animal procurement law and prohibited the release of pound animals to research institutions.

At present, there are battles underway in California, Massachusetts, and Minnesota to prohibit the release of pound animals to research institutions or to repeal old animal procurement laws. However, the fight is not restricted to state legislatures—it takes place at the municipal and local levels as well. The following accounts of events in Florida and Chicago are examples of a nationwide trend.

## *Florida*

For 19 years, the Jacksonville, Florida, municipal pound has been supplying the University of Florida in Gainesville with dogs. However, early this year a group of activists in Gainesville, led by Professor Tom Simon of the university's philosophy department, called attention to this traffic in animals and raised objections to it. A general debate about the practice ensued.

After the debate had proceeded for about a month, the university invited Jacksonville officials, including representatives from the local newspaper, the *Jacksonville Journal*, to tour the facilities. Bob Phelps, a columnist with the newspaper, noted that "the animals appeared to be clean, well fed, relatively free of parasites and healthy. The facilities were excellent, clean and expensive." However, Phelps also observed that there were aspects of the tour that aroused his suspicions and cited several locked rooms (individuals were invited to put on sterile garb and enter the rooms, but nobody took up the offer) and unexplained animal cries. The veterinarian in charge of the facility also refused a request from the press to drop in unannounced on some future date, arguing that he was too busy to accommodate them. Nevertheless, such an invitation was offered later. Phelps accordingly returned to the facilities unannounced at the end of March and found a dog bleeding to death in an unattended cage. He called for help but it was too late to save the animal. The death of this dog provided the critical evidence for action by the Jacksonville city officials. Jack Goldberg, the mayor, announced a few days later that he was suspending further shipments of animals to Gainesville, pending a full-scale report from the University of Florida.

The committee at the University of Florida that has been investigating the incident has now decided to recommend basic changes in the care of animals used in experiments. Under former procedures, the veterinary staff of the animal resources facilities left all decisions on postoperative care of animals to those who were conducting the research. Now, staff veterinarians are authorized to review all postoperative procedures, and it is recommended that they have absolute control over what is done to the animals. In the case of the particular dog found by Phelps, the researcher concerned had removed it from the intensive care unit 3 to 4 days earlier than is recommended under standard operating procedure. According to reports, he stated that he felt unhappy that the animal was being confined in a small cage (however, this procedure is done purposely so that dogs do not strain their surgical wounds) and therefore moved it to a larger cage, so that it could have more room to move.

A similar battle has broken out in Pensacola, Florida, where the local animal shelter has been providing over 2,000 animals a year to Tulane University (Louisiana) via Wayne Fowler, an animal dealer in Alabama. At the present time, Fowler pays \$5 per dog and \$3 per cat, which produces an income of approximately \$10,000 a year for the shelter. Fowler has declined to provide the shelter with any information about his resale rate, but on the East Coast pound dogs are currently being resold for \$50 to \$85 per animal.

Not surprisingly, Tulane University and Fowler have been campaigning to preserve their trade in animals. In fact, Tulane University reports that the Pensacola pound is its sole source of supply (local shelters in New Orleans apparently have refused to turn over animals to research institutions). Representing the humane viewpoint, groups in both Florida and Alabama have been campaigning to stop the practice. The Board of Commissioners is currently examining a proposal to develop a comprehensive contract or agreement with Fowler and Tulane Uni-

versity, setting out the following terms. The animals should be sold only to Tulane University. The price should be increased to \$10 for dogs and \$5 for cats. Mr. Fowler should send copies of all inspection reports made by the USDA to his facility. Tulane University should provide a copy of a comprehensive agreement indicating their needs and purposes for obtaining the animals purchased. Finally, the sale of animals by the shelter should cease if it is determined that conditions are inhumane, either at Mr. Fowler's establishment or at Tulane University. This is where the situation stands at present, but the lobbying to end this trade in animals continues.

### Chicago

The University of Chicago Medical School has recently been attacked for using pound dogs in student exercises. One alderman, Mr. Rittenberg, took action by drafting a proposal to reform animal control in the city, which included prohibition of any further release of animals to research facilities.

The fight was started as a result of a complaint by an anonymous medical student at the University of Chicago, who objected to the use of dogs in training exercises. The Medical School is no stranger to such protests—their introductory practical manual notes that:

*Animal experimentation has produced great and lasting benefits to medicine and to mankind, as all educated people know.... Students and investigators at this and other universities where dogs are available for teaching and research should realize that this privilege was hard-earned by their predecessors, but will be threatened again and must be fought for again in each generation.*

The manual also notes that

*Until the passage of laws permitting dogs to be made available from city pounds, medical schools in certain parts of the country were able to*

use dogs to only a limited extent in teaching, and less extensively in research than they would have desired. Thanks to the efforts of the late Dr. A.J. Carlson, the University of Chicago and other medical schools in Chicago have been able for many years to utilize dogs extensively in teaching and research, greatly to the benefit of all persons concerned.

It is apparent that the medical profession is once again being forced to fight for the privilege of using dogs, as humane groups throughout the city are lobbying the city council to support Rittenberg's proposed amendments.

### Conclusion

The events in Florida and Chicago are examples of similar activities that are taking place all over the U.S., as pound "seizure" once again becomes a rallying cry for national and local animal welfare groups. On one hand, research interests argue that millions of dogs are killed annually by pounds and shelters, and that this loss of animals represents a tragic waste. The implication is that it would be wiser policy to make use of some of these animals for research and teaching (*ILAR News* 25:15, 1981). On the other hand, humane societies object to the use of former "pets" in laboratories. At this stage, it is unclear who will prevail in the struggle for public support. However, Abbott D'Ver, a member of the Research Beagle Breeders Association, has predicted that "the pound dog will be in scarce supply within 4 years and prohibited from use entirely within 10 years" (*Lab Anim* 10(5):25, 1981).

### Fish Relieved to Find They Are Animals

The sigh of relief that echoed throughout Cape Cod Bay may not have been audible to the rest of the nation, but in Massachusetts, fish have been legally declared as animals. This point became

the central issue in a landmark decision by a state appeals court, when the court upheld the contention of the Massachusetts Society for the Prevention of Cruelty to Animals that fish are indeed animals, since they require an appropriate environment and regular human care (like dogs and cats), and that they must therefore be provided protection under the state's anti-cruelty law. Specifically, the MSPCA had gone to court to stop a traveling concessionaire from awarding live goldfish in plastic bags as prizes. The Society further argued that random winners of the goldfish might not be prepared or willing to provide adequate care for the fish, and that negligence and suffering might therefore result.

The definition of what, in the legal sense, constitutes an animal varies widely from state to state. In Oklahoma, for instance, the courts persist in denying that chickens are animals. The birds are thus locked out of protection under the state's anti-cruelty law. This is one reason why the undeniable cruelty of cockfighting continues to flourish in Oklahoma.

### Further Work on EEC Standards for Battery Cages

In the last issue of the *Journal*, we reported that the EEC Council of Europe had formulated new specifications which it believed represented a sound compromise between humane considerations for laying hens and the constraints of economic necessity. The most salient specification was the minimum cage area of 500 cm<sup>2</sup> to be allotted to each bird. Producers with cages already in use were given until 1995 to comply; new units were to comply by July 1, 1983. However, considerable variation was noted among member countries: the British Welfare Code had already recommended a 550-600 cm<sup>2</sup> standard, while, for example, Denmark required 800 cm<sup>2</sup> as its legal minimum.

Now, the Committee on Agriculture has begun to consider the finer details of

implementation of the new standards, including the economic ramifications. Since introduction of the new requirements will increase production costs, the Committee has recommended that the Commission propose measures to prevent economic disruption of the internal EEC market due to importation of cheaper eggs from non-member countries, where these standards do not apply. The committee also noted that the pace of studies on how to upgrade the welfare of laying hens should be increased, to provide a sound factual basis for establishment of the specific details of the standards.

The Committee also recommended that immediate measures should be taken to improve the lot of the hens who must now endure extreme crowding: in some farms, the birds are provided with as little as 300 cm<sup>2</sup> per animal. It was considered that 450 cm<sup>2</sup> would represent a reasonable figure for this short-term phase of the program.

Measures that were considered and rejected included: (1) a higher minimum standard (600 or 750 cm<sup>2</sup> per bird); (2) earlier implementation of the directive; (3) assistance to farms affected by the standards; and (4) fines for infringement. It was also decided that inspections of farms were necessary to ensure compliance with the new regulations.

### **Between a Rock and a Hard Place**

In the course of "rescuing" dogs from the fate of euthanasia or life in a research lab, William A. Snyder of Baltimore, president of the Maryland Anti-vivisection Society, has created a hellish situation for the very animals he claims to be trying to protect.

On his farm in rural Maryland, Mr. Snyder has been keeping 237 dogs within a 1-acre enclosure. County authorities have filed a civil suit to remove the dogs from Snyder's property, on the grounds that conditions on his farm are unsanitary and rampant with health problems.

James S. Pilachowski, the Harford County animal control chief, remarked that "I've never seen anything like that in my life and I've been doing this for 12 years....I think four or five animals are adoptable and the rest will have to be put to sleep." He found that the 1-acre tract was covered with dead rats, deep rat holes, and animal feces. And the dogs themselves were in terrible shape. Many were almost hairless from mange, while others had missing legs and no eyes; they traveled in packs and fought constantly.

Snyder, in his rebuttal to the county's suit, claims that "his sole and paramount concern has been for the humane care, containment, and treatment of animals, in vehement opposition to the use of such animals for medical experimentation or their otherwise premature death."

But the horrifying conditions on the farm seem in no way commensurate with these kinds of idealistic sentiments. It is the unfortunate task of those concerned for animal welfare that they are sometimes forced to make choices between nearly equivalent sets of repugnant conditions.

### **Taking a More Accurate Census**

One of the most difficult—and controversial— aspects of the practice of game management is determining just how many of each kind of species are left in a particular region. The first, and crudest, method for limiting the "harvest" of animals was the legal imposition of limits that each person could take of a particular species, or limiting the length of the season when animals could be killed. But it soon became obvious that knowing how many animals you had killed in a given year gave scant information on crucial items like distribution and general health.

Over the years, the Commonwealth of Virginia has slowly been refining its methods for checking on animal populations. Their first step was establishing a

requirement that all fur buyers submit an annual report showing the total numbers of furs or pelts bought and sold. Then, in 1965, a new regulation stipulated that all beavers (and later, bobcats and otters) must be tagged by game wardens before they could be sold. Other data compiled included information from trapper and hunter surveys and trapper license sales reports.

But all of this was still virtually useless in trying to figure out just how many animals were left after a particular year's kill had ended. Therefore, a recent state-wide study has begun, to get more accurate population counts. Permanent routes or transect lines are established in selected areas, at 2/10-mile intervals. On 2 consecutive days in October, wildlife management area supervisors sample approximately 3,500 stations, by counting the tracks of animals that visit the stations.



DICK RANDALL

A similar technique has been introduced over the last 2 years to count aquatic furbearers. Streams and bridges are randomly selected, and scent stations are placed within 30 feet of the bridges. Again, as with the land animals, counts of tracks are taken. However, after the 2 years of using this method of censusing, there is still some doubt as to whether it gives as accurate a picture of

population sizes as it does for land furbearers.

To gain some insight into other aspects of wildlife status, graduate students at Virginia Polytechnic Institute are obtaining carcasses from cooperating trappers and examining them for evidence of breeding age, litter size, and reproductive history. Life tables are being constructed, and tissue samples will be analyzed for levels of the toxic substances PCB's, Kepone, lead, and cadmium.

### **Sociology and Wildlife: The Tuna-Porpoise Controversy**

Among other things, the tuna-porpoise controversy that was the subject of so much publicity during the 1970's brought to light one of the fundamental problems in solving disputes about the "harvesting" of animals. During this debate, as in few other cases, the outlines of a classic dichotomy of point of view became clear. The fishermen represented a principally lower-class group whose lives were guided by principles that included the validity of the work ethic, close family ties, and the importance of independence and freedom—the right to act as your own boss. Another predominant aspect of the fishermen's perspective on things was a concentration on short-term profits, in order to keep afloat financially from one year to the next. Little concern was given to the longer-term problem of eventual overfishing. Nor was there much thought given to fish populations other than those selected for harvest and sale. In short, fish were seen as economic resources, rather than as fellow creatures with certain natural rights.

In strong contrast, those who are most committed to protection of whales and porpoises are most likely to come from middle-class backgrounds, and believe that populations of these animals must be maintained at levels that will be conducive to the support of healthy eco-

systems. This group is also highly supportive of efforts that support the concept of animal rights, in particular the right to protection from cruelty, suffering, and extinction. This principle is especially important in the instance of specific animals such as wolves, whales, and porpoises, where guilt for past human actions is a significant emotional factor.

To make matters more complicated, this divergence of viewpoint has been institutionalized in a parallel divergence of governmental policy. On the one hand, fishery management has emphasized the maintenance of specific fish species, for human exploitation. The theory used in preservation of specific stocks was that fish would continue to replenish themselves as long as their numbers were kept at peak reproductive levels (approximately 50 percent of the unexploited population level). On the other hand, the 1972 Marine Mammal Protection Act, which declared a moratorium on the killing of virtually all species of marine mammals, was oriented toward the preservation of the total ecosystem. "Optimum sustainable population" levels were the goal of this program, and the short-run economics of the fishing industry received far less attention.

The practical problem of the killing of porpoises during tuna fishing has pretty much been solved. But the differing systems of values represented by the two groups, the fishermen and the ecologists (and the correspondingly different theories of wildlife management) will inevitably result in similar clashes of interests, both in the courts and in the media.

### **Alternatives in Canada**

In the last issue, it was reported that the Natural Sciences and Engineering Research Council of Canada was providing a small sum of money to support a tissue culture training course at the University of Saskatchewan. However, the

Council has recently taken even more vigorous action to promote the development of alternative techniques. According to an NSERC publication (*Contact*, 1982, 7(1):26) the Council has responded to suggestions from the Canadian SPCA that alternatives should be promoted. Therefore, its grant selection committees will discuss the use of alternatives with applicants and will encourage grantees to explore the possibility of using alternative methods. They comment that:

*Many researchers holding NSERC grants already use alternative methods in their research projects, but few are actually working on research aimed at improving existing non-animal testing models, at developing new models, or at validating the usefulness of such models.... Council supports the development of alternative methods and wishes to alert qualified members of the community to this research topic.*

### **Protecting Laboratory Animals**

It is the contention of J.R. Held and V. Milochine that man's use of animals entails several distinct kinds of responsibilities. In the instance of research animals, these fall into three categories: (1) technical, (2) ethical, and (3) legal. Technical concerns include factors such as selecting the proper animal species, providing the proper kind of environment and care, and designing experiments so as to use the fewest possible animals. Ethical considerations, on the other hand, are grounded in an inherent respect for life that must be one of the chief principles held by anyone who uses animals. Humane treatment and proper care are aspects of such ethical considerations. Legal requirements are, in part, derived from these ethical concerns. This article, then, provides a broad framework for conceptualizing and discussing the myriad of considerations that are germane to the question of using animals in research and testing. (Abstracted from *Anim Reg Stud* 3:273-299, 1980/1981.)



## No British Aid for LD50 Alternatives

Mr. David Steel (of Lib, Roxburgh, Selkirk and Peebles) had asked the government to consider making a contribution to a research program aimed at funding non-animal alternatives to the LD50 and Draize tests, especially in light of the considerable support already given to this effort by several cosmetic and drug manufacturers.

Mr. Timothy Raison, Minister of State for the Home Office, explained that the government had no plans to contribute any funds, on the grounds that "alternatives to the use of live animals are best developed by scientists in the course of their own work" and added (somewhat vaguely) that "the government regularly uses licensees under the Cruelty to Animals Act of 1876 to consider the possibility."

## The BVA and Animal Experimentation

In last quarter's issue of the *Journal*, Judith Hampson of the RSPCA outlined the intricate and occasionally tortuous process by which a number of groups — many of whom have been inimical to each other in the past — are working toward collaboration to push for a speedier update of the British 1876 Cruelty to Animals Act. As proposed in 1979, the main reform proposals drafted by this collaborative effort include the need to:

- Restrict pain
- Ensure a substantial reduction in the number of animals used
- Develop and use humane alternative methods of research
- Ensure public accountability.

Meanwhile, the RSPCA itself has advocated a stance of complete opposition to painful experiments but, at the same time, defines "pain" and "suffering" somewhat loosely. While the Society accepts the fact that there is considerable ambiguity in its definitions, it still believes that reasonable ways for judging severity of pain can be established.

Recently, however, the BVA has conducted its own assessment of the problem of pain in experimental animals, and has drafted a list of 16 points on the subject (summarized in *Vet Rec* 110:241, 1982). Some of the most significant of these are:

- Recognition of the necessity of animal experiments
- Support for the now-famous three Rs — refinement, reduction, and replacement
- A requirement that all scientific procedures likely to cause pain be legally controlled (e.g., the production of antisera)
- In *exceptional circumstances*, the use of live animals should be permitted for attaining manual dexterity
- Anesthetized animals, not allowed to recover, should continue to be used in higher education
- Opposition to the practice of pound seizure.

Notably, however, the BVA has refrained from making any statements about *what kinds of experiments* should or should not be permitted.

The BVA has supported the idea of the equality of all species used in research, and would therefore delete the current passages of the law that designate special treatment for dogs, cats, horses, and monkeys. Rather, each species should be treated according to its particular physiological needs. This "democratic" position relative to the whole spectrum of animal species likely to be used in experiments is, to our knowledge, unique.

As a guideline for measuring pain, the Association advocates using the so-called Littlewood categories, first devised in 1965, which delineate three states of pain:

1. Discomfort (usually indicated by negative signs like poor health, lethargy, and decreased appetite).
2. Stress ("a condition of tension or anxiety predictable or readily explicable from environmental causes, whether distinct from or including physical causes").

3. Pain (indicated by positive signs like struggling, crying out, or convulsions).

In response to the "16 points," the Home Secretary commented that the BVA's work constituted "an especially important and informed contribution," but did not feel that the list offered a definitive basis for any new legislation on animal experimentation.

### **AVMA Animal Welfare Committee to Focus on "Veterinarian Awareness"**

During its second meeting on March 10-11, The AVMA's Animal Welfare group adopted a set of what it calls "guiding principles." (The *Journal* reported on the Committee's first meeting in 3(2).) These principles, like its earlier policy statements, seem carefully formulated to allow the AVMA to gently side-step virtually all of the major issues that most people associate with "animal welfare." For example:

- The Committee reiterated that "AVMA positions should be concerned primarily with the scientific aspects of the medical well-being of animals, rather than with the philosophic or moral aspects."

- "Enhanced utilization of veterinarians" was advocated, to "make a major contribution to improve animal welfare."

- Veterinarian awareness, however, was stressed as "the most urgent priority." Vets need to know the implications of animal welfare-related issues "for themselves, their communities, and society."

- The Committee saw no need for new legislation to protect animals used in research: "current laws and regulations, when properly enforced and implemented, are adequate to ensure humane care and treatment of animals."

- There was opposition to bills like H.R. 556: such diversion of funds to develop non-animal alternatives was seen as "expensive, restrictive, and nonproductive." Instead, the Committee opted

for less direct means of reducing the numbers of animals used in research and testing such as "education on experimental design and reduction of federal requirements for environmental protection."

- The term "animal rights," since it was judged to conflict with the Committee's goal of scientific objectivity, will not be used. The term was also considered to have little meaning in the current legal context, since "the law has not clearly recognized animals as having legal or moral rights."

- Support, by the AVMA Foundation, for studies on the "behavioral and physiological responses of animals in various environmental situations that affect their medical well-being" was recommended. However, no specific mechanisms for funding, or any target dollar amount, were suggested.

It must be granted that this is only the beginning of the Committee's efforts; a whole gamut of subcommittees is still at work formulating policy statements on 35 animal welfare issues. Nonetheless, the broad outlines of the Committee's intent seem to be clearly emerging: it represents a reactive response, to an already high level of awareness of animal problems among the general public. As such, its major work will focus on keeping veterinarians informed about how they can effectively diffuse any present or newly emerging concerns about animal welfare. For there is nothing in this set of "guiding principles" to suggest that the AVMA could, even potentially, take some sort of active role in the pursuit of ameliorating the problems that result from the thorny questions related to our exploitation of animals.

### **Adrenal Steroid Insufficiency in Racehorses**

For years, common thinking has held that adrenocortical failure is a primary cause of poor performance in racehorses. So administration of adrenal steroids

themselves or of adrenocorticotropin, which induces production of these steroids, has been a standard treatment. However, scant evidence of low plasma cortisol levels in poor performers has ever appeared in the literature.

To determine whether adrenal insufficiency was truly a consequence of stress in horses, plasma cortisol levels were measured in two groups of horses, 6 that were stressed and performing poorly, and several that were racing well. Results showed that, although one healthy gelding had a low cortisol level, the mean values for the stressed groups of horses were not significantly different from unstressed horses, and none of the values in any individual horse was low.

However, testosterone levels were also monitored in the male horses of both groups, and these values were found to be significantly lower in stressed than in healthy horses. Similar findings have been noted in humans: testosterone levels drop when men are subjected to severe psychological or physical stress. The presumed causation is a temporary reduction in luteinizing hormone which, in turn, stimulates testosterone production.

Monitoring of testosterone levels is not recommended as a general procedure for assessing stress, though, since the levels of this hormone show a normal cyclical variation and, as a response to stress, the decrease in testosterone can only be considered a nonspecific response. (Abstracted from H.W.G. Baker *et al.*, *Aust Vet J* 58:70, 1982.)

### **Mixed Reviews for Automatic Poultry Walker**

A newly patented device, not quite a robot, but more sophisticated than the standard scarecrow, has been designed for use as an "automatic poultry walker." A dummy is suspended from an overhead track such that it travels slowly through the poultry house, thereby simulating a human caretaker. The device is controlled by a time clock and also has a thermostat override.

The rationale behind the development of the device was based on the observation that birds which have more frequent contact with a caretaker seem to fare better, perhaps because the commotion created by his presence increases both feeding and dissipation of heat in hot summer weather.

But an evaluation of the system, by Daniel Hooge of Texas A & M University, gave equivocal results. Two sets of broiler houses were used, one equipped with the device and the other without it. First, although there were slight increases in flock weight, feed conversion, and mortality in the device-equipped broiler houses, these differences were not statistically significant. And, in monetary terms, investment in the device did not appear to be economic. Calculated grower payments were about \$15 more per year for the flocks provided with the simulated walker, but this additional \$75 a year (\$15 x 5 flocks per year) would not be sufficient to justify investment in the new equipment.

### **Standing on Their Own Two Feet**

Consumers, of late, have shown an increasing demand for the larger roasting chicken, with a market weight of about 7 lb. But until recently, the growth in the roaster industry has been hampered by the problem of leg weakness among these heavier birds. Specific conditions have included twisted or crooked bones, shortened bones, enlarged and/or swollen hock joints, and slipped tendon. These conditions are often severe enough to result in debilitation and death.

W.H. Hulan *et al.*, as reported in *Poultry Science* (59:748, 1980; 60:172), 1981) set out to discover precisely what factors were involved in the development of leg diseases in chickens. Basically, they considered two variables: genotype and diet. In an initial set of experiments, diet composition was held constant, and seven different genotypes were compared for percentage mortality (to age 84 days) and body weights at 28,

56, and 84 days. In a second set of studies, two genotypes that had shown a significant difference in mortality were fed diets that contained protein contents that were lower than, equal to, or higher than that available in most commercial feeds.

It was found that genotype was an important variable. Two genotypes, in particular, had better feed conversion and significantly lower mortality (due to the lower frequency of leg problems). Monetary returns were higher as well, even though the birds in these groups were somewhat lighter in final weights.

But perhaps the most important finding was that, as the protein content of the diets decreased, feed conversion increased, too. At the same time, low-protein diets meant a decrease in occurrence of leg abnormalities and, consequently, lower mortality.

These studies represent an excellent example of how carefully controlled scientific studies can be used to create a better (and more economical) world, for both producers and livestock. Animal welfare and monetary return need not be permanent adversaries.

### Survey Uncovers Americans' Ignorance About Animals

At the request of the Interior Department's Fish and Wildlife Service, Dr. Stephen Kellert of Yale University has interviewed 3,107 adult Americans to find out the extent of their knowledge about issues relevant to animals and wildlife conservation. While the original study was done in 1978, Kellert is still analyzing the data, and has recently published two new reports on his findings. Here are some of the salient points:

- Most animal-related activities are restricted to pet ownership (67 percent of those surveyed owned a pet), watching television, or visiting zoos.

- In a further breakdown, television emerged as the main vehicle for exposure to animals for 78 percent, where-

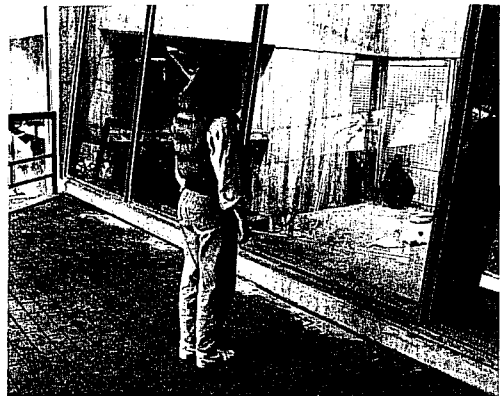
as zoo trips provided the primary contact for 46 percent.

- An important finding for the animal welfare movement was that concern for *individual animals* was seen as more important than concern about species populations for 58 percent of those surveyed. This result has important implications for planning in wildlife management, which has traditionally focused on manipulating total population levels.

- Of those questioned, 75 percent did not know that the statement "spiders have 10 legs" is false, and only slightly more than half knew that veal does not come from lamb.

- Extent of education, as a demographic variable, emerged as the single most sensitive indicator affecting knowledge of animals.

NATIONAL ZOOLOGICAL PARK/JESSIE COHEN



Ray Arnett, Assistant Secretary for Fish and Wildlife and Parks, finds this display of ignorance troubling "because it indicates that the public is not prepared to make informed decisions about the complex wildlife problems and controversies that we will undoubtedly face in the remainder of this century."

Ironically, however, this lack of knowledge about wildlife may actually serve to protect animals, in some instances. The Department of the Interior has recently been pushing for what amounts to a small-scale war against the coyotes of the West, through its decision to resume the practice of denning and attempts to get EPA to repeal its ban on the poisonous Compound 1080. But Kellert's report indicates that a full 75 per-

cent of the individuals surveyed in 1978 thought that the coyote was an endangered species. Thus, a great majority of the population may be anything but receptive to Interior's efforts, and perhaps their sentiments can be marshaled as part of an effective campaign to initiate active opposition to the widespread destruction of these animals. (See *Int J Stud Anim Prob* 3(2):99, 1982 for detailed coverage of the 1080 controversy.)

### **Clever Modification of Ames Test Monitors Environmental Mutagens**

To assess the relative mutagenicity of each of the chemicals found in a sample of air, scientists have been using a fairly complex two-step process. But A. Bjorseth *et al.* have recently devised a quick and easy, one-step process for separating and then identifying the mutagens, which are often also carcinogenic. The new method utilizes one element of the old technique—thin-layer chromatography (TLC) plates. The sample, mixed with a liquid solvent, is applied to the silica gel of the plate. Next, the solvent is allowed to soak upward over the plate. The various chemicals in the original sample move upward at varying rates, depending on their solubility in the solvent. Then, in the old method, each separate spot on the plate was scraped off and analyzed separately by one of several available techniques.

What Bjorseth has done is to utilize the intact plate in conjunction with the Ames test, a non-animal alternative procedure for assessing mutagenicity by using a strain of the bacterium *Salmonella* that cannot make the amino acid histidine (because of a simple genetic mutation). A sample of the *Salmonella*-containing culture medium is spread right over the TLC plate, after the chemical mix of the air sample has been sorted by the solvent.

Then, if any of the chemicals in the original sample is a sufficiently potent

mutagen, it will diffuse up through the layer of culture medium and cause a back mutation, *i.e.*, a reversion to the ability to make histidine, in the *Salmonella* organisms, and colonies of these bacteria will appear on the plate.

This new technique is an excellent example of an innovative non-animal method for doing routine testing. Its many advantages include simplicity, speed, and lower cost, as compared with older procedures.

### **Ban on Sperm Whaling May End**

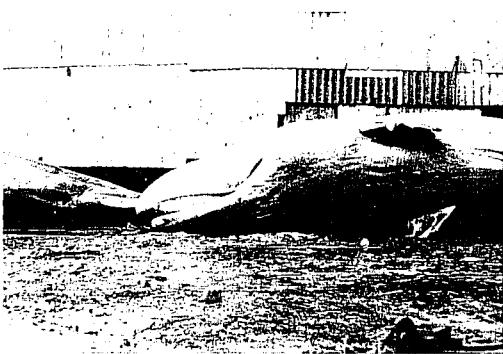
The intricate chess game of the International Whaling Commission continues to turn on moves and counter-moves that utilize economic sanctions, global politics and, on occasion, science.

An extraordinary meeting was held in late March to arrive at a decision on the specific issue of whether the general ban on sperm whaling (agreed to at the last full Meeting in July 1981) should be extended to cover the area off the coast of Japan. Looked at from this viewpoint, the 1981 ban was hardly an outright victory, since the actual agreement, while establishing zero quotas for all sperm whales in other areas, excluded those in Japanese waters. One member of the commission moved quickly to close this loophole by appending a footnote to the ban that would forbid any catch in this area until the commission had set a specific quota for Japanese waters. Japan then countered by objecting to the footnote; according to the commission's rules, Japan is not bound by the stipulation in the footnote. This, then, was the task of those at the March meeting: to set a scientifically based quota on the Japanese whale hunt. But if the full meeting of the commission, in July, fails—as the March meeting did—to establish a quota, Japan will be left free to keep on taking whales.

The question of establishing a quota revolves, in turn, on which of the two

current rival models you choose to adopt for estimating whale populations. One model, favored by the Japanese, is based on the animals' age at sexual maturity. Most scientists agree that this model fits poorly with the available data. A second model, developed by the International Institute for Economic Development (IIED) uses measurements of the length of the whales; it seems, at first, to offer much better agreement with the data.

While the Japanese assert that sperm whale populations number about 200,000 animals, and that they are proposing to slaughter only 0.5 percent of the total, special characteristics of whale procreative behavior make the situation somewhat more complex than this simple ratio would indicate. Whales are polygamous: one bull impregnates several females. Because the Japanese have recently taken a greater proportion of the more profitable bulls, pregnancy rates have declined. The model based on length of animal has been successfully used to predict this decline. It also supports the hypothesis that, as a further consequence, populations will continue to decrease for the next 10 years or so, even if no whales are killed.



HSUS

Yet the modicum of protection afforded the males in the last few years should, if the model is accurate, mean that an upsurge in pregnancy rates should soon show up in the data. So far, however, there has been little evidence of such a turnaround. So the IIED model, too, may have to be discarded.

However, when the full commission meeting is held in July, both models may

be relegated to oblivion, if there is a vote for a complete moratorium on commercial whaling.

## Alternatives at NIH?

The Division of Research Resources (DRR) of NIH is considering a new activity in biomedical research model development. This program will explore opportunities and limitations to the development of model systems that have potential as general resources for the biomedical research community. DRR already supports the development of animal models but now seeks to expand its activities in modeling: it will explore the opportunities and limitations to the development of research models employing lower organisms, tissues/cells in culture, and mathematical and computer simulations.

DRR has begun to develop an information retrieval system that identifies the research materials or subjects used in extramural research projects. Research projects employing model systems other than higher animals can thereby be identified. The collected data defines "pools" of investigators who have expertise in the various modeling areas of interest. The NIH extramural grants portfolio for fiscal year 1980 has been subdivided into 16 categories, based upon the nature of the "research material" used in the project (see Table for summary).

This information will be utilized by DRR to develop appropriate workshops and symposia and to make plans for an information clearinghouse on models for biomedical research. The DRR comments that progress "in achieving these objectives would be enhanced were a discrete budget to be assigned to this activity. It could serve as a centralized activity in this area for NIH as a whole. The information available through this activity has already proved of value in response to the 'animal welfare' issue and could prove of greater value in the future."

**TABLE 1 Research Materials Used in NIH Extramural Research Projects—FY 80**

Classification	Dollars (%)	Projects and Subprojects (%)
Humans	669,235,383 ( 23.6)	8,960 ( 28.7)
Mammals	741,665,562 ( 26.1)	8,904 ( 28.5)
Humans and mammals	334,207,609 ( 11.8)	3,612 ( 11.6)
Other categories involving humans and some combination of vertebrates and invertebrates	34,816,814 ( 1.2)	378 ( 1.2)
Mammals and nonmammalian vertebrates	56,830,720 ( 2.0)	620 ( 2.1)
Mammals and invertebrates	23,551,005 ( .8)	297 ( 1.0)
Mammals, nonmammalian vertebrates and invertebrates	5,949,303 ( .2)	59 ( .2)
Nonmammalian vertebrates	55,404,312 ( 2.0)	760 ( 2.4)
Nonmammalian vertebrates and invertebrates	6,502,857 ( .2)	80 ( .3)
Invertebrates	53,863,116 ( 1.9)	733 ( 2.4)
Non-animal	856,667,500 ( 30.2)	6,831 ( 21.9)
TOTAL	2,838,694,181 (100)	31,264 (100.3)

Total: Dollars = \$2,838,694,181  
 Projects and Subprojects = 31,264

## Effects of Psycho-physiological Stress on Captive Dolphins

Nick Carter

### Introduction

Morgane (1978) has stated that:

*Man sees all other creatures through the narrow focus of his own knowledge and sees the whole image in distortion. We patronize animals for their incompleteness and dependence and for their fate in having taken form so far below ourselves... a great mistake, for animals should not and cannot, be measured by man. Many are gifted with many extensions of senses we have lost or never attained.... They live by voices we may never hear. Some may not be our accepted brethren, but also they are not our underlings.*

If this "narrow focus on human knowledge" can be said to distort the image of the whole, it follows that an overly rigid adherence to orthodox scientific criteria, when attempting to measure the intelligence and behavior of dolphin "specimens" (particularly in the abnormal situation of confinement) will diminish, not increase, our ability to understand these creatures. An approach to studying dolphins is as harmful to our interests as it is to those of the dolphins if the procedures used involve capture and confinement for entertainment or "education." In this process, the animal

is demeaned, so that its natural character cannot be appreciated. And the educational experience that accrues is hardly a wholesome source of learning, because the knowledge of the teachers themselves is distorted, since it is based on experiences with abnormally conditioned animals.

In fact, dolphins are phenomenal beings, with complex behavior patterns and capabilities that, so far, have been recognized by very few people. Those who have begun to appreciate these animals are almost unanimous in agreeing that familiarity breeds awe at the potential abilities of dolphins. For example, Jerison (1978) comments:

*If being human means being receptive to new ideas, it surely requires us to recognize that, although unique in many ways, human intelligence has counterparts in other species.... If we define intelligence as encephalization, we have to consider humans as part of a set that also includes some cetacean species...*

It is therefore reasonable to postulate that the conditions of capture and confinement might be as stressful and harmful to dolphins as they would be to humans. This hypothesis is supported by the following evidence.

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### *Stress from Handling in Wild Animals*

Konrad Lorenz, Nobel Prize winner and the "father" of animal ethology observes:

*...Similarities and analogies in the nervous processes of animals and men are sufficiently great to justify the conclusion that higher animals do indeed have subjective experiences which are qualitatively different from but in essence akin to our own (Lorenz, 1967).*

For instance, shock is a condition of collapse that may follow severe psychological or physical pain or injury. Stress, resulting from fright, anxiety, frustration, and apprehension, as well as boredom and isolation, may result in degenerative psychological and physical changes that may lead to prolonged illness and death. Dolphins suffer shock in capture, in addition to stress during and after landing, transport, and eventual confinement.

For reasons unknown, some individual animals, like certain individual human beings, have a greater ability to endure stress than others. For example, off the North Pacific coast of the U.S. and Canada, between 1962 and 1973, 50 killer whales (*Orcinus orca*) were caught and kept for oceanaria. (This total does not include 12 that died during capture operations.) The 2-year mortality in captivity was reported to be 25 percent in immature whales and 87 percent in adults (Bigg and Wolman, 1975). It is noteworthy that the data show that the captive females had a considerably higher mortality rate than did the males. Another intriguing finding was that the females who died showed a higher growth rate than those that survived (Ridgway, 1979).

While domestic animals, doubtless due to adaptation, suffer decreased trauma, and possibly less shock, after restraint and transport, it is well recognized that shock elicits a more violent and severe

reaction among wild animals (Harthoorn, 1979; Thorpe, 1965). Often, mortality may be related to a combination of stresses that are experienced in rapid succession. Further, the possibility that death may be an *emotional* response to stress cannot be avoided (Kisker, 1964).

Recognition of the problem of mortality among live wildlife prompted the drafters of the Convention on International Trade in Endangered Species (CITES) to include clauses stipulating that "specimens will be so prepared and shipped as to minimize the risks of injury, damage to health or cruel treatment." Additional recognition of the stresses imposed on dolphins in traveling shows prompted the South African Minister of Economic Affairs, Chris Heunis, in 1977, to amend Section 16(i) of the Sea Fisheries Act 1973 to ban the importation of dolphins and killer whales for display purposes.

### *Capture Shock and Confinement Stress in Dolphins*

There is no longer any question that psycho-physiological effects have been, and continue to be, prime causes of the suffering and consequent high mortality rates among captive dolphins. Many of the psycho-physiological disorders have been classified on the basis of the bodily symptoms by which they are commonly expressed among both humans and animals (Kisker, 1964). The symptoms noted in necropsy studies performed to determine the immediate physical cause of death among captive killer whales demonstrates a striking correspondence with those of psycho-physiological disorders (Ridgway, 1979).

In attempts to alleviate the trauma and subsequent effects that induce "shock" diseases, dolphins are on capture injected with cortisone and a prophylactic, broad-spectrum antibiotic (Saayman and Tayler, 1973). Despite this treatment, however, mortality rates re-

main high, and the number of dolphins that successfully endure captivity for long periods of time is commensurately low. Of 21 dusky dolphins (*Lagenorhynchus obscurus*) captured for display off Hout Bay (South Africa) between 1961 and 1978, only one survives. The longevity of the dusky dolphin in its natural state is estimated to be 25 to 30 years.

In dolphinarium abroad it is, in many cases, difficult to form a true idea of mortality rates because deaths of dolphins and whales have not been announced, and replacement animals have been given the same names as the dead animals, so that the public will not become aware of the deaths (Greenpeace, 1980). However, in 12 years of operation (1966-1978), the Napier Marinelands (New Zealand) admitted that their death tally for dolphins stands at 68, and this number does not include those dolphins that were dead when brought aboard or that were maimed during catching. Nor does this figure include those that died while being brought into port. In 1980 Marinelands in New Zealand decided to discontinue keeping dusky dolphins for display, because they did not adapt well to captivity (Robson, 1978).

Frank Robson (1978), a gold medalist for his scientific work on behalf of the Amsterdam Museum of Natural History, and the chief trainer at Napier Dolphinarium for 4 years, has expressed his concern at the lack of recognition that almost every disease contracted by captive dolphins has a strong causal link with psycho-physiological factors. He based his claim on 14 years' experience with both practical and scientific research on the disastrous relationship between psycho-physiological reactions and the health of dolphins in captivity.

Robson noted the sudden deaths of perfectly healthy dolphins, who had their blowholes tightly closed while out of the water. This indicated to him that death was due to psycho-physiological

shock reaction incurred while enduring "stress" that had advanced to severe shock. When this stage is reached, processes that control the dolphin's natural breathing function of "blowing" are blocked by the effects of its disturbed emotional state.

The opportunity to test this assumption came when Robson investigated the reason why hundreds of dolphins were accidentally captured in trawl nets in waters near New Zealand during 1970-1974. The examination of these unfortunate victims revealed that they were physically healthy; few had died as a result of drowning. Only 5 percent were found to have water in the lungs; 92 percent had died from the ravages of psycho-physiological shock reaction, and the remaining 3 percent had died from internal hemorrhage of the heart—another type of shock reaction, since no water was found in the lungs.

Robson divided death in dolphins caused by psycho-physiological reactions into three categories:

*Category 1:* Sudden death, such as described above.

*Category 2:* Death of dolphins that survived the catching and transportation to pools, but died within a month of being caught.

*Category 3:* Dolphins that died, usually from respiratory problems, after being held captive for varying lengths of time—many were found to be suffering from pneumonia.

Robson considers that the inability of dolphins to deal with mental/emotional disorders, usually attributable to captivity, was responsible in many cases for the pneumonia or other respiratory problems.

He states that the first symptoms of the presence of these psycho-physiological states is a gradual or spasmodic decline in appetite. The effect of this is a reduction in blubber thickness, thereby

decreasing the dolphins' natural insulation. This, in turn, causes a lowering in body temperature and is responsible for the dwindling ability of dolphins to retain body heat in the chilly water. This phenomenon is a critical factor in the promotion of pulmonary affliction and pneumonia. Based on observations of the ante-death behavior of afflicted dolphins, we can conclude that little doubt remains that, while pneumonia may have been the direct cause of death, this condition was induced by stress. Death therefore resulted from the psycho-physiological inability of the dolphin to maintain sufficient control over respiration due to inhibitory emotional disturbances.

The foregoing observations tend to be supported by those of K.S. Norris, Professor of Natural History, University of California, an internationally recognized authority on free-ranging dolphins. Writing in 1976, he states:

*Confinement compresses natural activity so tightly that it may be distorted beyond recognition. The captive porpoise forms unnatural life patterns, like the antelope in a zoo, used naturally to ranging many miles a day which comes to promenade in a stereotyped figure of eight around his cage until the single track is rutted a foot below the surrounding soil....Rigid daily regimes such as dolphin show routines are especially stressful.*

The observations of Norris have been endorsed by many former workers at dolphinaria, as well as others who have studied these animals closely. In mid-1979, the former dolphin trainer and curator of the Port Elizabeth Oceanarium, Colin Tayler—who was employed at the oceanarium for 10 years, during which time he was responsible for building up the famous dolphin shows—said he believed stress was the main cause of three recent dolphin deaths (*Cape Argus*, August 14, 1979).

### Case Histories

A popular attraction at the California Academy of Sciences is the dolphin tank. Officials, noticing that one of the dolphins occasionally bled from the intestine, conducted tests and found that the animal had developed a duodenal ulcer. *He was treated on the anthropomorphic premise that the cause was anxiety.* At length, it was found that this animal alone, of the entire group, had become nervous because of the crowds that peered at him through a glass wall. When the glass wall was covered up, the condition cleared up (Cousteau, 1975).

Bimbo, a pilot whale of Marineland of the Pacific, was less fortunate. When his female, and a Pacific white-sided dolphin, which were his only companions, died he swam round his tank for days, clasping each of his dead companions with a flipper. He refused food and lost 20 percent of his 4,500-lb weight. Dr. M.E. Webber, a physician, suggested he had become psychoneurotic: in human terms, a manic-depressive. One day, as the usual crowd watched him through the glass of his tank, he swam with all his power against a glass port, shattering it. A few months later, because of his deteriorating mental state, he was released near a pod of other pilot whales. An "emotional convict" returned to freedom, he was not seen again (Cousteau, 1975).

Dan, a male bottlenose dolphin (*Tursiops aduncus*) became so aggressive after 8 years of captivity in Port Elizabeth Oceanarium, that he had to be released in August 1976. Not only did he threaten human beings, but he prevented the other dolphins in the oceanarium from performing their circus acts. It has now been alleged, though not confirmed, that Gambit, the Atlantic bottlenose dolphin caught off Walvis Bay in November 1976 is showing similar traits. His female companion, Purdey, died early in

March 1979 of *Klebsiella pneumoniae* infection.

Malia, an Indian Ocean bottlenose dolphin (*Tursiops aduncus*) was captured by the Port Elizabeth Oceanarium in April 1977. Later, she was confined in solitude for months because it was presumed that she was pregnant. Her only companion throughout this time was a child's plastic surfboard, which she managed to wedge just under her tail. In March 1979 she contracted *Klebsiella pneumoniae*, but recovered after treatment. After the capture of three new bottlenose dolphins in 1979, she was returned to Port Elizabeth.

About mid-1980, because repairs were being made to the main pool, she was transferred again to a small retaining pool. A few weeks later she went off her food and, despite feeding every 5 hours plus the application of a range of antibiotics, she became progressively thinner; she died in early September. The symptoms prior to death, which was believed to be due to respiratory disease, conformed very well with Frank Robson's description of disease induced through psycho-physiological disturbance.

### Conclusion

The author's 25 years' experience with the consequences of the stress caused by the capture, holding, and transport of wildlife amply confirm that these procedures result in a tragic wastage of life. Some extremes are accurately described by the former dealer Jacques-Yves Domalain in his well-known book *The Animal Connection*. Through visits to captive animal facilities in many parts of the world, the author endorses the views of K.R. Norris concerning the deleterious effects of captivity, as shown in the abnormal behavior of captive animals. Despite the difficulties, field work with gorillas, chimpanzees, orangutans, and wolves demonstrates

that the most realistic observations and assessments on wild animals are those made in the natural environment.

Notwithstanding the useful captive breeding work done by a number of reputable zoological establishments, studies by IUCN/SSC/TRAFFIC 1980 and others (Burton and Barzdo, 1980) show that, overall, zoos continue to be consumers rather than conservors of wildlife, and that husbandry of captive animals for breeding for ultimate re-introduction into the wild is of minimal, if any, significance. Possibly, the maintenance of captive wild animal populations for educational and research purposes may alleviate continued pressure on wild populations. But the evidence shows that the profit-motivated use of animals in circus-type displays merely consumes animals; it does not assist in their conservation.

### References

- Bigg, M.A. and Wolman, A.A. (1975) Live-capture killer whale (*Orcinus orca*) fishery, British Columbia and Washington, 1962-1973. *Fish Res Board Can* 32:7.
- Burton, J. and Barzdo, J. (1980) IUCN/SSC/TRAFFIC. World Wildlife Fund, London.
- Cousteau, J. (1975) *The Ocean World of Jacques Cousteau*, Argus and Robertson, London.
- Greenpeace (1980) *Outlaw Whaler*, Greenpeace, San Francisco, CA.
- Harthoom, A.M. (1979) Comparison of two methods of capture of wild animals. *Vet Rec* 108:37.
- Jerison, H.J. (1978) Brain and intelligence in whales. In *Whales and Whaling*, vol. 2, Australian Government Printing Service, Canberra, Australia.
- Kisker, G.W. (1964) *The Disorganized Personality*, McGraw-Hill, New York, NY.
- Lorenz, K. (1967) *On Aggression*, University Paperbacks.

- Morgane, P.J. (1978) Whale brains and their meaning for intelligence. In *Whales and Whaling*, vol. 2, Australian Government Printing Service, Canberra, Australia.
- Norris, J.S. (1976) *The Porpoise Watcher*, Norton, New York, NY.
- Ridgway, S.H. (1979) Reported causes of death of captive killer whales (*Orcinus orca*). *J Wild Dis*, vol. 15, January 1979.
- Robson, F.D. (1978) The urgent necessity for further study and research into the disastrous effects of psychophysiological attributes to which dolphins are susceptible. Unpublished paper, New Zealand.
- Saayman, G.S. and Tayler, C.K. (1973) Techniques for the capture and maintenance of dolphins in South Africa. *J Fifth Afric Wild Mgmt Assoc* 3(2): 89-94.
- Thorpe, W.H. (1965) The assessment of pain and distress in animals. In *Report of the Technical Committee to Enquire into the Welfare of Animals Kept under Intensive Livestock Systems*, Her Majesty's Stationery Office (Cmd. 2836), London.

## The Judeo-Christian Tradition and the Human/Animal Bond

James A. Rimbach

*This paper surveys the role of animal imagery in the literature of the Old Testament and in post-biblical Jewish literature, discusses biblical materials that speak to the relation of humankind to animals, and assesses the subsequent use of these traditions to support or negate specific attitudes toward the natural environment.*

*A righteous man has regard for the life of his beast, but the mercy of the wicked is cruel (Proverbs 12:10).*

It is always perilous to some degree to ask a modern question of an ancient text or tradition. The obvious danger is that the investigator will shape the tradition to suit his or her own predetermined purposes and ignore or explain away that which does not fit those aims. The Judeo-Christian tradition has had that sort of

treatment on the very question that we will investigate here. Interpretations based on self-interest have been all the more easy to arrive at because the human/animal companion bond is a subject that has not received a great deal of self-conscious reflection in the Judeo-Christian tradition and its literatures, and because many of the ecological conditions within which the contemporary inquiry is raised did not obtain in the ancient world.

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At the same time, this situation holds promise for an even-handed treatment. Historians agree that we get a more genuine answer to our questions when we derive our answers from allusions and reflections in texts that are not tendentious. We are attempting here to follow the advice of Goethe: "*Wer dem Dichter will verstehen, muss im Land des Dichters gehen*" ("To understand the poet, one must go to the poet's land," i.e., meet him on his own turf).

### *A Survey of Biblical Imagery*

Not surprisingly, we find that the human/animal bond, because it enriches the life and culture of a people, is reflected in that people's literature. This is precisely the case with the Old Testament, the primary literature of the Judeo-Christian tradition and the literary legacy of some 1,000 years of Hebrew culture. We notice in the first place that the human/animal bond is a particularly rich source of simile and metaphor in the hands of poets and sages. What follows is a very brief survey of such allusions.

The smaller forms of animal life consistently form a picture of plague and infestation. The sacred text is abundant with lice, mice, locusts, grasshoppers, mosquitoes, moths, maggots and worms:

*The moth shall eat them like a garment, and the worm shall eat them like wool (Isaiah 51:8).*

In a culture where animals had a more direct role in the general economy than in our own day, reference to them served as indication of wealth and power, and military prowess.

*They carry their riches on the backs of asses, and their treasures on the humps of camels (Isaiah 30:6).*

*The snorting of their horses is heard from Dan; at the sound of the neigh-*

*ing of their stallions the whole land quakes (Jeremiah 8:16).*

*I have plundered their treasures; like a bull I have brought down those who sat on thrones (Isaiah 10:13).*

Other examples could be added referring to the camel, the ass, the lion, and various kinds of cattle.

Much in the animal world was very threatening in ancient times, and threat to life is often illustrated in the texts with reference to the bear, the lion, leopard, hyena, wolf, boar, and various birds of prey.

*It is as if a man fled from a lion, and a bear met him; or went into the house and leaned with his hand against the wall, and a serpent bit him (Amos 5:19).*

*The eye that mocks a father, or scorns an aged mother — the ravens of the wadi will pluck it out; carrion-birds will eat it (Proverbs 30:17).*

Recent generations were not the first to enlist religion in the service of stimulating good behavior in children!

The reader of the Old Testament scriptures will note references to the natural environment that are used as pigments to add color to the poet's painting and make it more vivid. For instance, references to wildlife are used to characterize certain locales:

*(Of the land of Edom): From generation to generation it shall lie waste; none shall pass through it for ever and ever. But the hawk and the porcupine shall possess it, the owl and the raven shall dwell in it (Isaiah 34:10f.).*

*...through the wilderness, with its fiery serpents, and scorpions and*

*thirsty ground where there was no water (Deuteronomy 8:5).*

*A land laid waste so that no one passes through, and the lowing of cattle is not heard; both the birds of the air and the beasts have fled and are gone (Jeremiah 9:9).*

The passages cited above can be compared with the picture of the "peaceable kingdom," so famous, from Isaiah, chapter 11:

*The wolf shall dwell with the lamb, and the leopard shall lie down with the kid, and the calf and the lion and the fatling together, and a little child shall lead them. The cow and the bear shall feed; their young shall lie down together; and the lion shall eat straw like the ox (Isaiah 11:6-7).*

This idyllic or "messianic" scene is at the same time an acknowledgment by the prophet that there is something wrong in the observable relationship of predator and prey in the animal kingdom, as well as in human/animal relationships. He not only promises that things will change, but also evidences a deep yearning for such change.

### *Animals and Humankind*

So far, we have seen little in the scripture that expresses any sense of a direct relationship between humans and animals. We do see this, however, when we begin to notice the frequent comparisons between human feelings and those ascribed to animals.

*I lie awake, I am like a lonely bird on the housetop (Psalm 102:7).*

*I will make lamentation like the jackals, and mourning like the ostriches (Micah 1:8).*

*Like a swallow or a crane I clamor; I moan like a dove (Isaiah 38:14).*

*Her maidens lamenting, moaning like doves (Nahum 2:7).*

*We all growl like bears, we moan and moan like doves (Isaiah 59:11).*

*I am a brother of jackals, and a companion of ostriches (Job 30:29).*

One particularly strong expression of the importance of the human/animal bond is the intimation that humans have a lot to learn by the observation and imitation of animal behaviors. This is a frequent theme of the literature of the Old Testament that is called "Wisdom Literature." It finds expression in fables (which, though infrequent in the bible, are quite common in other literatures of the ancient East) and other more brief proverbial sayings:

*Go to the ant, thou sluggard... (Proverbs 6:6-11) (to learn industry and foresight).*

*The locusts have no king, yet all of them march in rank; the lizard you can take in your hands, yet it is in kings' palaces (Proverbs 30:27).*

*The leech has two daughters: "Gimme" and "Gimme" are their names! (Proverbs 30:15).*

Human duplicity is compared to a spider's web; the serpent is the one with a "sharp tongue"; even birds know where to go — a pre-scientific observation of migratory habits. The ox and the ass know their master's crib, and bridles are necessary to curb the unruly behavior of the horse and ass. The folk saying "a little bird told me" finds this interesting precursor from ancient times:

*Even in your thoughts, do not curse the king, nor in your bedchamber curse the rich; for a bird of the air will carry your voice, or some winged creature tell the matter (Ecclesiastes 10:30).*

Models of parental habits can be seen in the animal world too: "hide me in the shadow of your wings" is a frequent phrase in the Psalms (17:8, 36:8, and others), and the protective attitude of "the hen who gathers her chicks" finds expression in the New Testament (Matthew 23:37).

In all of this there is recognition that the animals and humans enjoy a kind of symbiotic relationship: the animals contribute to people's enjoyment of life by their sheer presence, by their labor and, perhaps surprisingly to us today, by the many sounds that they contribute to the environment.

*Winter is past,  
the rain is over and gone.  
The flowers appear on the earth,  
the time of singing has come,  
and the voice of the turtledove  
is heard in our land (Song of Songs  
2:11-12).*

The animals are thought of as companions to humans, sharing a common destiny in weal and woe. The pragmatic/economic view has its place too: "where there is no ox, there is no grain" (Proverbs 14:4). The animals display a kind of wisdom from which humans can benefit by observation and imitation, particularly in their foresight, their willing dependence, and their seeming lack of anxiety. Note this picture of the carefree enjoyment of good times:

*You shall go forth leaping like calves from the stall (Malachi 3:20).*

*Consider the birds of the air: they neither sow nor reap nor gather into*

*barns, and yet your heavenly father feeds them (Matthew 6:26).*

Another indication of the human/animal bond is seen in the widespread use of animal names in the bible. We mention here some examples, many of which occur in special diminutive forms indicative of the affection with which they were bestowed: little camel, horse, wild-ox, young cow, lamb, lion, pig, puppy, fox, ass, foal, gazelle and young gazelle, ibex, badger, hawk, tortoise, raven, dove and various other birds, bee, beetle, grasshopper; even snake, worm, flea, and fish!

But what about evidence of pets? There is very little expression given to this in the bible, but undoubtedly that special affection between little children and the young animal — calf, kid, lamb — was very prevalent in a society in which herdsmanhood played so large a part. We do find mention of birds kept in cages, and though some of this may have been for purposes other than companionship, that played a role as well:

*Will you play with him as with a bird, or will you put him on leash for your maidens? (Job 41:5).*

One story that does mention a pet is among the most moving in all the Old Testament. It is recorded in II Samuel 12, told by the prophet Nathan to King David:

*There were two men in a certain city, the one rich and the other poor. The rich man had very many flocks and herds; but the poor man had nothing but one little ewe lamb, which he had bought. And he brought it up, and it grew up with him and with his children; it used to eat of his morsel and drink from his cup, and lie in his bosom, and it was like a daughter to him.*



The story continues, as the rich man, lacking food to serve a traveler, seizes the poor man's lamb and serves it up for supper to his guest. At this point in the story, David interrupts with a burst of emotion:

*Then David's anger was greatly kindled against the man; and he said to Nathan, "As the Lord lives, the man who has done this deserves to die; and he shall restore the lamb fourfold, because he did this thing and because he had no pity."*

As the story concludes, we learn that the prophet is using the story to bring the king to account for his seizure of another man's wife — Bathsheba.

Some might be surprised to learn that in ancient times, quite generally, dogs were not kept as pets as they are now. Dogs were commonplace, but they were pariah-dogs, scavengers, and carrion animals who also served to sound the alarm against intruders, rather than as the objects of much affection. In biblical literature a reference to dogs is usually used as a term of self-abasement on the one hand, or as an image of a savage enemy on the other.

*Like a dog that returns to his vomit is a fool that repeats his folly* (Proverbs 26:11).

*He who meddles in a quarrel not his own is like one who takes a passing dog by the ears (or tail)* (Proverbs 26:17).

Before concluding this part of our survey we must note how, in the Song of Songs, female beauty is described in this most unusual way:

*...hair like a flock of goats moving down the slopes of Gilead...and breasts like twin fawns of a gazelle* (Song of Songs 4:1, 5).

## *Animals in Jewish Literature*

The post-biblical literature of the rabbis is marked by extensive legislation designed to ensure a degree of kindness toward animals and to prevent them from being mistreated. A special phrase, *za'ar ba'al hayyim*, stood for "cruelty to anything possessed of life" and was considered a crime. It was recognized that animal slaughter was necessary to society, but very elaborate precautions were taken to minimize the pain involved (Grandin, 1980). By the time of the Middle Ages, Maimonides was to list 70 proscriptions that constituted unskillful and therefore unacceptable slaughter. Investigators have consistently remarked that Jews were not known to kill animals for sport, and had regulations stipulating that fish must be netted, not hooked. The word "hook" occurs in the bible only as a metaphor of cruelty or as an implement of torture used by foreigners (Danby, 1933; Montefiore and Loewe, 1963).

Typical of the attitude of the rabbis is this proscription in Gittin 62a: "Rabbi Judah said in the name of Rab, A man is forbidden to eat anything until he has fed his beast" (Montefiore and Loewe, 1963).

Rabbinical literature is full of stories that center on well-known biblical figures, such as Noah and the Ark, for this particular incident gave occasion for many tales about animals. Here we cite a few references that will illustrate the attitudes that were part of this tradition.

*If men make a sea voyage, and take cattle with them, should a storm arise, they jettison the animals to save mankind, because people do not love animals as much as they love human beings. Not so is God's love. Just as He is merciful to man, so is He merciful to beast. You can see this from the story of the flood... God remembered Noah and the ani-*

*mals that were with him in the ark (Montefiore and Loewe, 1963).*

*Rabbi Tanhum ben Hiyya said: "The falling of the rain is greater than the giving of the Law, for the giving of the Law was a joy only to Israel, while the falling of the rain is a rejoicing for all the world, including the cattle and the wild beasts and the birds" (Montefiore and Loewe, 1963).*

*While Moses was feeding the sheep of his father-in-law in the wilderness, a young kid ran away. Moses followed it until it reached a ravine, where it found a well to drink from. When Moses reached it, he said, "I did not know that you ran away because you were thirsty. Now you must be weary." He carried the kid back. Then God said, "Because thou hast shown pity in leading back one of the flock belonging to a man, thou shalt lead my flock, Israel" (Montefiore and Loewe, 1963).*

*Once Rabbi Judah the Prince sat and taught the Law before an assembly of Babylonian Jews in Sephoris, and a calf passed before him. It came and sought to conceal itself, and began to moo, as if to say, "Save me." Then he said, "What can I do for you? For this lot (i.e., to be slaughtered) you have been created." Hence Rabbi Judah suffered toothache for 13 years.... After that a reptile (or perhaps a weasel) ran past his daughter, and she wanted to kill it. He said to her, "Let it be, for it is written, 'His mercies are over all his works'." So it was said in heaven, "Because he had pity, pity shall be shown to him." And his toothache ceased (Montefiore and Loewe, 1963).*

The theme in this last passage is reminiscent of that of the biblical book of Jonah, where the attitude expressed by the prophet about the inhabitants of Nineveh is countered by the sentiment of the mercy of God toward animate and inanimate life alike: And the Lord said, "You pity the plant, for which you did not labor, nor did you make it grow, which came into being in a night, and perished in a night (—because it gave you shelter from the sun). And should not I pity Nineveh, that great city, in which there are more than a hundred and twenty thousand persons who do not know their right hand from their left [i.e., are below the age of discretion], and also much cattle?"

### *The Divine Economy*

The framers of the biblical tradition also addressed themselves to themes on the order of the natural world, their own place in it, and the place of the animals that share with humanity the mysterious thing called life. The primary expression of this viewpoint is found in certain portions of the biblical book of Genesis, plus a number of other sources, chiefly the Psalms. In Genesis, the first 11 chapters, we find what may be called a primordial history, or pre-history, into which are worked the basic reflections of the culture on the question of how things came to be the way we see them.

Life is a divine gift: "then the Lord God formed man of the dust from the ground, and breathed into his nostrils the breath of life, and man became a living being" (Genesis 2:7). These words stress not only the fact that life is an independent gift, but also the common bond of man with the earth. And, as with man, so with the animals: "out of the ground the Lord God formed every beast of the field and every bird of the air" (Genesis 2:9). But in addition to stressing what man and the animals have in common, the tradition also underlines certain critical dif-

ferences. The human being is to exercise a dominion over nature: *"let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth... fill the earth and subdue it"* (Genesis 1:28). The human being has a special task: to be the responsible representative of the cosmic Lord:

*Thou hast given him dominion over the works of thy hands; Thou hast put all things under his feet, all sheep and oxen, and also the beasts of the field, the birds of the air, and the fish of the sea, whatever passes along the paths of the sea. O Lord, our Lord, how majestic is Thy name in all the earth* (Psalm 8:7-9).

There is, of course, an ambiguity in this commissioning. It holds in it the potential for great benefits to all, and also the potential for violations. Restrictions to the domination of the creation were always recognized and found their way into the national law of Israel (Exodus 23:19, 34:26; Deuteronomy 22:9; Leviticus 19:19, 22:24, 27 and elsewhere).

There is a felt propinquity, an affinity between man and nature; but also an estrangement and an alienation. There are boundaries, limitations; and closeness as well as distance. As people begin to find themselves in an interdependent relationship with the animal world, the idea of dominance is gradually shaped into one of stewardship. Because all this life derives its origin and its final purpose from a source outside of itself, the man of Genesis is one who tends the garden of God; he is a caretaker (Wolff, 1974).

Equally important as the first chapters of Genesis, for an understanding of man's role as part of nature but also separate from it, are the further statements of the sixth to ninth chapters, the story of the great flood. Here it is said that God has decided to destroy from

under heaven all flesh that has the breath of life. Man and animals here share a common fate. But a remnant is saved. In the context of this primeval history, the episode serves the writer's purpose to show that the way things are is not the way they were intended to be but, rather, an accommodation.

When man and the animals emerge from the ordeal of the flood, the guidelines of the accommodation are spelled out:

*Behold, I establish my covenant with you and your descendants after you, and with every living creature that is with you, the birds, the cattle, and every beast of the earth with you, as many as came out of the ark* (Genesis 9:9).

The animals may breed abundantly on the earth, and be fruitful and multiply. To the human being are addressed these words:

*Be fruitful and multiply, and fill the earth. The fear of you and the dread of you shall be upon every beast of the earth and upon every bird of the air, upon everything that creeps on the ground and all the fish of the sea; into your hand they are delivered* (Genesis 9:1-2).

The human being is now explicitly responsible:

*Every moving thing that lives shall be food for you; and as I gave you the green plants, I give you everything. Only you shall not eat flesh with its life, that is, its blood* (Genesis 9:3-4).

The human being now begins to eat flesh — in Genesis 1 and 2, humans were vegetarian. But when man slaughters and kills, he is to know that he is touching something which, because it is life, is

in a special way God's property, and as a sign of this he is to keep his hands off the blood. This regulation can be thought of as a regulation of necessity. Human life is inviolable — animal life is violable; for all their similarity, there is some recognized difference in psycho-physical totality (von Rad, 1961).

In this discussion, as in other areas of concern to the Old Testament writers, there is, in the background, a notion of the precariousness of the order of nature: every living thing in the world is dependent on God's constantly letting his breath of life go forth to renew the created order (Eichrodt, 1967).

*These all look to thee to give them their food in due season. When thou givest to them, they gather it up; When thou openest thy hand, they are filled with good things; When thou hidest thy face, they are dismayed; When thou takest away their breath, they die and return to their dust. When thou sendest forth thy Spirit, they are created and thou renewst the face of the ground (Psalm 104:27-30).*

Man and animal alike share this utter dependence upon God. But humankind is treated throughout as an independent spiritual "I," while the animals are not; that is, they are not considered to be conscious of the source of their life, and God's good intention for them is in large part mediated by man. In this task, man shares responsibility with the divine.

The recognition that the animal world is not conscious of the source of its gift of life places an added responsibility on the human being. There is throughout the Old Testament the added dimension that man and beast share the same fate, but it is not open to manipulation by the animal, as it is by man. The human being is the shaper of destiny for the animals. This is first expressed in the

Genesis account of the meaning of the animals:

*The man gave names to all cattle, and to the birds of the air, and to every beast of the field (Genesis 2:20).*

In this manner the Old Testament brings onto the scene the idea of *culture*. The creative force that man enjoys is to be discovered in the development and application of his aptitudes (Eichrodt, 1967).

The bible also contains another, more pessimistic statement of the shared fate of man and beast:

*Moreover I saw under the sun that in the place of justice, even there was wickedness, and in the place of righteousness, even there was wickedness. I said in my heart, God will judge the righteous and the wicked, for he has appointed a time for every matter, and for every work. I said in my heart with regard to the sons of men that God is testing them to show them that they are but beasts. For the fate of the sons of men and the fate of beasts is the same; as one dies, so the other. They all have the same breath, and man has no advantage over the beasts; for all is vanity. All go to one place, for all are from the dust, and all turn to dust again. Who knows whether the spirit of man goes upward and the spirit of the beast goes down to the earth? So I saw that there is nothing better than that a man should enjoy his work, for that is his lot; who can bring him to see what will be after him? (Ecclesiastes 3:16-22).*

Now, finally, we address ourselves to the subsequent use of the biblical tradition. We have seen that in the tradi-

tion there are evidenced feelings of ambiguity, as well as ambivalence toward the natural order and the role of humankind in it. Some have found in the scriptural material the impetus for great acts of kindness, others the justification for unspeakable cruelty. This might have been expected, considering the ways biblical materials have been used in other controversies throughout history. In truth, the bible represents an open tradition: it is questioning; full of awe at times, of fear at others. But it is clear that, "What people do about their ecology depends upon what they think about themselves in relation to things around them. Human ecology is deeply conditioned by beliefs about our nature and destiny... that is, by religion" (White, cited by Derrick, 1972). St. Thomas Aquinas has written (*Summa Theologica* I, 99:44-45): "God's purpose in creation was the communication of his own goodness, in which his creatures participate by reason of their existence and in the measure of it." That measure is now large, now small.

Only by the most heavy-handed and insensitive treatment can the bible be used to support the view that the natural world is "at our disposal." What place and what value the animal world and the rest of the created order have is inextricably bound to the question, "What values do we have, and why?" H. Paul Santmire (1970) has written, "Nothing comparable to modern exploitation of nature was known in biblical times. Exploitation and compulsive manipulation were simply not possible on so vast a scale in pre-industrial, pre-technocratic societies." This assessment remains true, but needs to be tempered by archaeological data which show that the critical measure here was not humankind's intent, but merely the state of its technology and its numbers.

The ecological ills of the present that are sometimes said to be the result of biblical influence (especially the com-

mand to "have dominion and subdue it") are not at all a necessary outgrowth of that statement, as I hope I have shown. The Israelite tradition, at least, did not evidence these sorts of sentiments. A case can be made quite to the contrary, as the present survey demonstrates. To the items mentioned already could be added the injunctions of Israelite law concerning kindness and sensitivity toward the animal world: not to seize the young in a wild bird's nest (and thus to jeopardize the future) (Deuteronomy 22:6); the Sabbath law that prescribes rest not only for people but also for the ox and the ass, or the prescription to let the land lie fallow on the seventh year so that the poor and the wild beasts can eat (Exodus 23:10); and finally, an injunction that maintains its familiarity to our own day, "the ox should not be muzzled when it treads the grain" (Deuteronomy 25:4). The fundamental picture that emerges from a study of the Judeo-Christian tradition is that humankind is not only to respect nature's rights in a passive way, but to act positively to preserve and defend them.

The attitude of superiority and contempt for nature is quite foreign, not only to the biblical world, but to the ancient world in general. I believe it can be shown to be an outgrowth of the eighteenth and nineteenth century mechanistic philosophies, and the elevation of technology above the ideal of service to humankind, such that technology assumes the role of a controlling force, all in the interest of a widespread materialism of a private and egotistical nature.

The desacralization of the world is not a program of church or synagogue; quite the contrary. Cold and mechanistic views have come from the laboratory, not the pulpit. The proper answer to this quandry is not a lot of mythical and mystical nonsense, but a humane reassessment done in reverence and humility, acknowledging the willing interdependence we can exercise in regard to our envi-

rons, and the benefits we can thereby enjoy. It is in our own best interest to do so.

*The catastrophes of history by which God punishes pride, it must be observed, are the natural and inevitable consequence of men's effort to transcend their mortal and insecure existence and to establish a security to which man has no right (Niebuhr, 1941).*

And finally, as Shakespeare comments:

*If then the heavens do not their visible spirits  
Send quickly down to tame these vile offences,  
It will come,  
Humanity must perforce prey on itself,  
Like monsters of the deep.  
— King Lear, IV, ii.*

### References

- Danby, H. (trans.) (1933) *The Mishnah*. Oxford University Press, Oxford, U.K., pp. 513-514.
- Derrick, C. (1972) *The Delicate Creation: Towards a Theology of the Environment*. Devin-Adair, Old Greenwich, CT, p. 19, citing Dr. Lynn White Jr., *The Environmental Handbook*.
- Eichrodt, W. (1967) *Theology of the Old Testament*, vol. II. J.A. Baker, trans., SCM, London, UK, p. 121.
- Grandin, T. (1980) Problems with kosher slaughter. *Int J Stud Anim Prob* 1: 375-390.
- Montefiore, C.G. and Loewe, H. (1963) *A Rabbinic Anthology*. World Publishing, Meridian Books, New York, NY, xci, pp. 42-47, 369-370.
- Niebhr, R. (1941) *Nature and Destiny of Man*, vol. I. C. Scribners, New York, NY, p. 138. Cited by Santmire (1970), p. 168.
- Santmire, H. Paul (1970) *Brother Earth*. Thomas Nelson, New York, NY, p. 57.
- von Rad, G. (1961) *Genesis*. Westminster, Philadelphia, PA, p. 127.
- Woff, H.W. (1974) *Anthropology of the Old Testament*. Fortress, Philadelphia, PA, pp. 159-165, 226-227.

## No Need to Be Boxed in: Group Pens and Grain for Veal Calves

Michael S. Mosner

### Background

My family has been in the wholesale veal business for 30 years. The basis of this business has been various breeds of female beef calves that are slaughtered at less than 500 lb. These calves are allowed to suck from cows and graze until

they are ready for market. Beef calves, however, tend to vary in quality and quantity depending on the time of the year that they are purchased and raised. Generally, calves become scarce in the spring, when feeders are buying calves to put out on pasture. Then, in the summer and

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fall, large numbers of calves usually become available, thereby depressing prices. Again, in the winter, calves become scarcer and consequently more expensive.

In the early 70's, there was a chronic shortage of calves. However, feed was cheap (interest rates were, too), and feedlot operators were snatching up everything that moved for beef. As a result, my father, David Mosner, had some difficulty procuring calves for veal production. At that time, Dr. Gardner of Brigham Young University was experimenting with the use of a grain diet for calves raised for veal. He concluded that there was no difference in taste or tenderness between grain-fed and milk-fed veal. After learning about Gardner's work, my father suggested that I do some work on grain-fed calves while I was attending Cornell University. Dr. R.G. Warner of Cornell agreed to sponsor and supervise me in an independent research project on the economical feasibility of grain-supplemented rations for veal calves. I concluded from these initial studies that grain-fed veal could be raised economically. The only remaining hitch was to find a means to end up with a calf carcass pale enough to satisfy the current preferences of consumers.

However, after the huge grain sale to Russia in 1974, the cost of feed skyrocketed. Indeed, a worldwide food shortage ensued. As a result, feed costs became exorbitantly high, and feedlot operators stopped looking for calves. This slack in demand caused a decrease in the price of calves, and the necessity of feeding grain to calves for veal production was greatly diminished.

Upon graduation from Cornell, I started raising milk-fed calves. Throughout the first 3 years, as a prime veal feeder, I continually experimented with different grain rations for calves. During most of 1980 and 1981, the price for finished milk-fed calves was quite low. Many growers were forced out of busi-

ness. Also, skim milk and whey prices rose, thereby placing extra economic pressures on the grower. And the finished price for prime veal fluctuated by as much as 86 cents per lb; there was no stability in the market. Then, in 1981, I began to raise only grain-fed calves, in order to circumvent the constraints of the traditional marketing channels.

### *Current Operation*

At present, there are three types of veal. These include the beef-type calves (discussed above), baby "bob" calves, which are slaughtered immediately after birth, and milk-fed calves. The production costs entailed in raising prime veal are particularly high. The sophisticated systems necessary for strict climate control and expensive automatic feeding machines place the price of milk-fed veal beyond the reach of most consumers. In contrast, bob calves are relatively inexpensive, but they provide a poor meat-to-bone ratio to the packer and therefore represent poor utilization of live-stock. As mentioned before, beef breeds tend to vary considerably in both quality and quantity throughout the year. Thus, grain-fed veal appeared to be a viable option for making consistently high-quality veal available to consumers at a reasonable price. Also, packers would be pleased because of the favorable meat yields attainable from grain-fed veal.

In our operation, calves are raised in group pens rather than in individual stalls. This allows the calves room to move around and to "socialize." This practice eliminates much of the stress put on the calves in crate systems. Further, because there is some iron content in the grain, the calves do not become as anemic as milk-fed calves. Anemia is a well-recognized stressor to calves, and a reduction in stress means that disease is less likely to develop. In addition, grain-fed veal provides better nutrition to the

consumer, because of the additional iron in the meat. This decrease in anemia is accomplished while the low levels of fat and cholesterol for which veal is noted are retained. In essence, grain-fed veal constitutes a highly desirable commodity, since it can be produced inexpensively, is a high-quality product, and is affordable to the average consumer.

We are currently operating in a converted free-stall dairy barn. We have capacity for about 600 calves. (However, additional stock can also be penned outdoors.) We buy calves that have an initial weight between 150 and 175 lb for grain-feeding. However, sometimes economics may dictate that we buy baby calves—in this case, milk replacer is offered until weaning, which occurs at 6 weeks of age. Calves are housed inside the barn and sorted into pens in groups of 20. Each pen is 12 by 32 feet, thereby allowing each calf about 20 square feet. Calves are finished at 450-500 lb, live weight, and this increase in weight requires about 4 to 5 months. Straw and old hay are used as bedding. When older calves first come into the barn, they are given an initial check for general health and an injection of vitamins. The calves are offered hay and a commercial calf starter. After 3 weeks, the calves are switched to the finishing ration, which consists basically of corn, with a protein supplement and essential vitamins and minerals. Baby calves, after weaning, are switched from milk to calf starter and ad lib water; after they have consumed about 100 lb of starter, they are switched to the finishing ration.

In the beginning, we used baby Holsteins in our operation. However, we have found that it is also economic to use other breeds, such as Hereford, Angus, and Charolais (purchased at 200-300 lb, live weight).

A salient advantage of this system is that labor costs per animal are substantially lower than with conventional

milk replacer systems. Since the calves are not individually penned and food is consumed as needed, one man can take care of several times more calves. However, without individual pens, it is not as easy to assess how much a particular calf consumes or to discern illness. For these reasons, skilled management is a critical factor in this program, as in all group pen operations. Another advantage of the grain-fed program is that there are usually a wide variety of grain suppliers to choose from, in contrast to the small number of milk replacer sources.

My finished calves have been graded as choice veal and are distinguished by a light pink hue and excellent conformation. The major problem we have faced so far arises from the myth perpetuated by some feed companies—that veal must be white to be of premium quality. Consumers have been repeatedly told that "If it's not white, it's not veal." I believe that this is an obvious fallacy that must be countered by effective educational efforts.

### *The Future of the Veal Industry*

Over the last decade, the per capita consumption of veal has steadily declined. Perhaps the most important reason for this decline has been the high price of veal and the resulting substitution of other meats. Consumers are now buying more of the reasonably priced products, such as poultry and pork. Chicken, turkey, and pork cutlets are currently being featured in many supermarkets and restaurants. Not only are these meats less expensive than veal, but they taste good, too. In my opinion, unless the veal grower can find ways to cut the costs entailed in production, he will simply price himself out of business. I believe that grain-fed veal is the best economic alternative to all other types of veal, for many reasons. Grain-fed calves offer the consistent high quality that the beef breeds do



not, the meat-to-bone yields that bob calves lack, and the relatively low price makes the product a nutritional and affordable choice for the consumer.

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## Reporting Requirements Under the Animal Welfare Act: Their Inadequacies and the Public's Right to Know

M. Solomon  
and  
P.C. Lovenheim

### *Introduction*

The Animal Welfare Act is the only federal statute designed to protect animals used in laboratory research. Under this law, research facilities are required to register with the U.S. Department of Agriculture (USDA) and to meet minimum standards of housing, care, and treatment for most warm-blooded animals. The Act is administered by the Animal and Plant Health Inspection Service (APHIS), an agency of the USDA.

The Animal Welfare Act established by law

*The human ethic that animals should be accorded the basic creature comforts of adequate housing, ample food and water, reasonable handling, decent sanitation, sufficient ventilation, shelter from extremes of weather and temperature, and*

*adequate veterinary care, including the appropriate use of pain-killing drugs.* [emphasis added]

The petitioner considers all provisions of the Animal Welfare Act important, but none more so than those that concern animals used in painful experimentation. The number of animals used in such procedures is great, and has increased over the years from 65,301 in 1974 to 122,650 in 1980, according to APHIS (1975, 1981) reports. (These figures are cited for comparative purposes only since their reliability is questionable.)

Since 1970, congress has required research facilities to show that during actual research and experimentation, pain-relieving drugs are used "appropriately" and in accordance with "professionally acceptable standards" of care. To this end, congress established the Research Facility Annual Reporting System.

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*[T]he Secretary [of Agriculture] shall require, at least annually, every research facility to show that professionally acceptable standards governing the care, treatment, and use of animals, including appropriate use of anesthetic, analgesic, and tranquilizing drugs, during experimentation are being followed by the research facility during actual research or experimentation (7 USC 2143 — emphasis added).*

Under current regulations, research facilities must file an Annual Report with APHIS showing the number of types of animals used in "actual research, testing, or experimentation," and indicating which tests involved "accompanying pain or distress to the animals." In instances when animals were used in painful procedures but were given no pain-relieving drugs, the Annual Report must include "a brief statement explaining the reasons for the same" (9 CFR 2.28 (a) (2)-(4)).

The Reporting System, functioning properly, should provide APHIS with information sufficient to demonstrate that researchers are using pain-relieving drugs "appropriately" and in accordance with "professionally acceptable standards." This was congress' intent and the System is, in fact, the only means by which APHIS can obtain such information on a regular and cost-effective basis. Effective administration of the Reporting System, therefore, is crucial to enforcement of this most important provision of the Animal Welfare Act. We therefore undertook an analysis of the reports from 1,211 facilities for FY 1979.

We conclude from the analysis that the Reporting System, as presently administered, fails to achieve its primary statutory objective: it does not provide APHIS with information sufficient to demonstrate that researchers have used pain-relieving drugs "appropriately" and

in accordance with "professionally acceptable standards." The chief reasons for this failing are (1) regulations and guidelines do not define "pain" or "distress," (2) regulations and guidelines do not adequately define "routine procedures," and (3) regulations and guidelines do not require meaningful explanations for the withholding of pain-relieving drugs in procedures acknowledged to cause pain.

The Reporting System, as presently administered, for the same reasons, also fails to achieve a secondary — but nonetheless important — objective: it does not generate reliable and meaningful information to the public about the use of animals in research. When congress passed the Animal Welfare Act amendments in 1970, it declared that animals used in research "deserve the care and protection of a strong and *enlightened* public" (H. Rep. No. 91-1651, 91st Cong., *reprinted in*, (1970) U.S. Code Cong. & Ad. News 5103, 5104 — emphasis added). The analysis also revealed serious transcription errors, involving tens of thousands of animals, by APHIS staff.

### *Statement of the Problem*

*Current regulations and guidelines do not define "pain" or "distress." Without such definitions, researchers appear to apply conflicting standards in interpreting these terms.*

Current regulations require research facilities to report annually to APHIS on the use of animals in "actual research, testing, or experimentation," and to indicate which tests involved "accompanying pain or distress to the animals" (9 CFR 2.28(a)). APHIS supplies researchers with a specific form for submitting the Annual Report ("Annual Report of Research Facility," VS Form 18-23) and has also issued instructions for completing the Report form ("Instructions for Submitting the Research Facility Annual Re-

port Form," VS Memo. 595.19) (1975) (Appendix B)).

The Report form is organized by species of animal covered by the Animal Welfare Act and by type of experiment. Experiments fall into three categories (in Category A, the species used is identified):

*Category B:* Experiments or tests involving no pain or distress

*Category C:* Experiments or tests involving pain or distress where appropriate anesthetic, analgesic, or tranquilizers were used

*Category D:* Experiments or tests involving pain or distress but where anesthetic, analgesic, or tranquilizers were not used.

Clearly, a registrant's determination as to whether an animal was caused "pain" or "distress" is essential to the proper completion of the Annual Report form. However, neither the regulations, nor the APHIS instructional memorandum, nor the Annual Report form itself defines these terms.

The result is that research facilities appear to apply different and conflicting standards in assessing the responses of animals used in similar procedures. Two examples are discussed below.

### 1. Eye and skin irritation studies

The Monsanto Company (Reg. No. 43-33), of St. Louis, MO, which performs eye and dermal testing of products, reported that it used 1,044 rabbits in Column D of the form, "Pain-No Drugs," and explained: "These studies by their nature cause distress to the rabbits." Similarly, Unilab Research (Reg. No. 93-154) of Berkeley, CA, reported eye and skin irritation studies in 1,150 rabbits, 50 of which were listed in Column D. The explanation attached to the Annual Report stated: "Some materials, based on the response in the test animals, are classified as 'corrosive.' During exposure to these corrosive substances, and during the subsequent evaluation period,

the animal may experience pain or distress."

In contrast, Revlon Research Center, Inc. (Reg. No. 21-43) of Bronx, NY, reported that 2,371 guinea pigs and 2,210 rabbits were used in "Draize Eye Irritation Studies" and "Primary Skin Irritation Studies" and yet listed all animals in Column B—"No Pain."

A more ambiguous approach was reflected by the Report of ALZA Corp. (Reg. No. 93-56) of Palo Alto, CA, which listed all of the animals it used in Columns B or C. The report stated that ALZA used New Zealand white rabbits "to study potential ocular and/or cutaneous compounds." The company explained that the use of pain-relieving drugs would "preclude meaningful interpretation of these test results," and that the animals did not undergo "procedures of an acutely painful nature requiring chemical restraint or analgesia." The former statement suggests drugs were indicated; the latter denies their necessity. The explanation continued, "Therefore, due to the experimental nature of the work, the number of rabbits experiencing pain or distress would be difficult to determine or construe in the given context." However, after having explained how and why pain-relieving drugs were not used, 180 rabbits were listed in Column C—"Pain and Drugs," and 397 rabbits were listed in Column B—"No Pain." No animals were listed in Column D.

### 2. Pyrogen testing

Pyrogen testing is the screening for preparations that might raise body temperature to a dangerous degree. Ortho Diagnostics, Inc. (Reg. No. 22-64) of Raritan, NJ, listed 819 rabbits in Column B ("No Pain") and explained "Animals are used for antibody production and pyrogen testing. When euthanized, appropriate drugs are used." Similarly, Burron Medical Products, Inc. (Reg. No 23-59) of Bethlehem, PA, listed 250 rabbits in Column B and explained, "Pyrogen and Intacutaneous [sic] Reactivity Testing as

per USP XIX does not involve pain or distress to the rabbits."

In contrast, John Hopkins University (Reg. No. MD-R-11) of Baltimore, MD, listed 300 rabbits in Column D—"Pain-No Drugs." The explanation attached to the Report stated: "Anesthesia not used for intravenous or interperitoneal injections or for pyrogen assay. Anesthetics would inhibit the response to pyrogens."

The test procedures discussed (eye and skin irritation, and pyrogen testing) were evaluated by the different registrants as causing differing amounts of pain and/or discomfort. The same protocols were used, and in many cases similar substances were introduced into test animals, yet there are inconsistencies among facilities in regard to the research category chosen on the Annual Report. Anecdotal evidence obtained by us provides further examples of inconsistency. For example, Dr. G.L. Enold, DVM, Director of Veterinary Medicine at ICI Americas, Inc., in a telephone conversation on February 4, 1981, bluntly told one of us (M.S.) that *all* toxicology work falls within the "No-Pain" classification. Dr. Enold's remark may have been in reference to work conducted at ICI Americas only, but even if that were the case, his statement would constitute a rather sweeping proclamation.

The inconsistencies surrounding the definition of "pain" and "distress" are further complicated by the current definition of "routine procedures," a problem that is addressed below.

*The current definition of "routine procedures" is inadequate, as evidenced by inconsistent application of the exemption by both researchers and APHIS officials.*

Current regulations provide that "routine procedures" performed on animals do not have to be reported on Annual Report forms. Regulations do not formally define "routine procedures," but offer three examples of procedures that are intended to fit into this category:

"injections, tattooing, and blood sampling" (9 CFR 2.28(a) (2)-(4)). Neither the APHIS instructional memorandum nor the Annual Report form itself offers further guidance as to how this term is to be applied, and a large number of cases were found in which the "routine procedures" exemption was inconsistently applied.

For example, challenge testing involves the injection of a vaccine or bacterin into a group of animals followed by injection of a selected disease agent to determine whether the animal has been immunized. (A control group receives the virus or bacteria, but not the vaccine or bacterin.) The cases discussed below involve challenge testing for *Leptospira* bacterin. Quoted statements are from the registrants' 1979 Annual Reports.

In the first case, Burns Biotec Laboratories, Inc. (Reg. No. 47-10) of Elkhorn, NE, listed 1,275 hamsters used in challenge testing. Though the bacterin was administered by injection, the registrant evidently did not consider this a "routine procedure" and listed all the animals in Column D—"Pain-No Drugs." The report explained, "The hamsters were used in *Leptospira* bacterin potency tests according to applicable 9 CFR 113 methods and for maintenance of *Leptospira* challenge cultures."

The second case in point concerns Jensen-Salsbery Laboratories, a division of Burroughs Wellcome (Reg. No. 48-12), of Kansas City, KS. In 1979, this registrant reported that it had used more than 32,000 animals in various types of challenge testing. This included 15,868 hamsters used in *Leptospira* challenge tests, just as Burns Biotec (noted above) had done. As noted by Solomon (1981), the 1979 annual report had been altered so that the numbers of animals listed as having been used under Category D—"Pain-No Drugs"—had been moved into Category C—"Pain and Drugs." Solomon stated that:

When informed of the discrepancy, Mr. J.A. McKeown, Production Manager and signatory on the report, stated that he had not changed the reports and had not been told by the USDA of any alterations. The USDA, responding to further enquiries, provided the following information.

In late 1979 or early 1980, Dr. Robert Whiting, then USDA-APHIS Chief Staff Veterinarian, contacted his area office in Kansas to enquire about the Jensen-Salsbery reports. After consulting with that office, Dr. Whiting relisted the numbers from Column D to Column C. He justified the action by referring to information he obtained from attachments to the reports, which...were of "challenge testing"...Dr. Whiting (personal communication—March 25, 1981) reasoned that because the tests involved injections, which are considered under the regulations to be routine procedures, there was no need to report them. He added that he felt the research facilities had misinterpreted or were unaware of the exemption. Dr. Whiting maintained that these particular inoculations cause, at most, only minor and temporary pain although he did concede that the infections induced in the control group, as well as in those animals that might receive an ineffective vaccine or bacterin, could cause considerable pain.

The disease agents used in the Jensen-Salsbery challenge tests were *Leptospira*, rabies virus and anaerobic bacteria. The attachments to the reports note specifically that in each instance, no pain-relieving drugs were administered. Mr. McKeown assumed that infections which cause pain and distress in untreated humans cause similar pain and distress in

untreated laboratory animals. Therefore, to comply with regulations, Jensen-Salsbery listed the animals in Column D.

The cases discussed above illustrate the practical problems that can result from the current definition of "routine procedures."

Some registrants provide no explanation for withholding pain-relieving drugs; others merely parrot language suggested by USDA, providing explanations that are perfunctory and unrevealing.

By law, research facilities must show that during actual testing on animals, pain-relieving drugs are used "appropriately" and in accordance with "professionally acceptable standards" (7 USC 2143). Current regulations require Annual Reports to list:

*The common names and approximate number of animals upon which experiments...were conducted involving accompanying pain or distress...and for which the use of [pain-relieving drugs] would adversely affect the procedures...and a brief statement explaining the reasons for the same (9 CFR 2.28(a) (4)).*

As the regulation indicates, pain-relieving drugs may be withheld from animals only if use of such drugs would "adversely affect" the test procedures. By *explaining* how this standard ("adversely affect") applies to each procedure, researchers can fulfill the statutory requirement of "showing" that professionally acceptable standards have been followed.

Animals used in painful tests without pain-relieving drugs are listed on the Annual Report form in Column D—"Pain-No Drugs." An instructional note at the head of Column D asks researchers to "Attach a brief explanation."

Further information for completing Column D is provided in the APHIS instructional memorandum:

*List the number of animals used where pain or distress was involved but where anesthetic, analgesic, or tranquilizing drugs were not used. A brief explanation why drugs were not used must be attached, e.g., testing of toxic products required by FDA, use of anesthetic, analgesic, or tranquilizing drugs would interfere with test results. Many other reasons in addition to this may be listed (VS Memo. 595.19 (1975) at p. 4).*

Several problems are associated with this aspect of the Reporting System. Two of these are:

#### 1. Failure to provide an explanation

The analysis revealed that a number of registrants recorded totals of animals in Column D—"Pain-No Drugs," but provided no explanation as to why pain-relieving drugs had been withheld. Nineteen facilities in 12 states using a total of 7,483 animals gave no explanations to accompany their Column D listings, and thus were in technical violation of reporting requirements (Table 1).

#### 2. Use of inadequate explanation

Some research facilities also attempt to explain the withholding of pain-relieving drugs by merely parroting the suggested "explanations" offered by APHIS in its instructional memorandum. These "explanations" are: "testing of toxic products required by FDA," and "use of anesthetic, analgesic, or tranquilizing drugs would interfere with test results" (VS Memo. 595.19 (1975) at p. 4).

The parroting of these "explanations" is a serious problem, not only because they are so perfunctory and unrevealing, but because they do not "show," as re-

quired by law, that pain-relieving drugs have been used "appropriately" and in accordance with "professionally acceptable standards."

A conservative analysis of all explanations contained in or attached to 1979 Annual Reports shows that 31 facilities in 9 states that listed 27,331 animals in Column D—"Pain-No Drugs," used the exact explanations or wording that was very similar to that suggested in the APHIS instructional memorandum. In addition, research facilities using 7,483 animals in FY 1979 offered no explanation for withholding pain-relieving drugs from animals. The total number of animals used in painful research without sufficient explanation, therefore, was more than 34,800—a figure equal to approximately 32 percent of all animals reported to have been used that year in painful research without drugs.

### Legal Considerations

*Present administration of the research facility annual reporting system violates both the letter and intent of the Animal Welfare Act.*

The original Animal Welfare Act of 1966 exempted from regulation the use of animals during actual research (80 Stat. 350, Sec. 18). In a Report accompanying the Act, congress stated that the determination as to when an animal is "in actual research" should be left to researchers to decide "in good faith" (S. Rep. No. 1281, 89th Cong., reprinted in (1966) *U.S. Code Cong. & Ad. News* 2635, 2639).

In 1970, a unanimous House Agriculture Committee added the assurance that "the research scientist still holds the key to the laboratory door" (H. Rep. No. 91-1651, 91st Cong., reprinted in (1970) *U.S. Code Cong. & Ad. News* 5103, 5104). Yet, in 1970, two important new elements emerged from congress' efforts to strengthen the Act.

**TABLE 1 Column D — "Pain-No Drugs," No Explanation**

Registrant	Reg. No.	Number/Name of Animals Used	Registrant	Reg. No.	Number/Name of Animals Used
SANDOZ, Inc. East Hanover, New Jersey	22-9	3 dogs 20 rabbits 4 primates	University of South Alabama Mobile, Alabama	64-8	200 hamsters
New Jersey College of Medicine & Dentistry Newark, New Jersey	22-20	125 guinea pigs 117 rabbits	Los Angeles County Harbor-UCLA Medical Center Torrance, California	93-16	4 primates
Rutgers, The State University Piscataway, New Jersey	22-25	50 guinea pigs 10 hamsters 50 rabbits	Cutter Laboratories, Inc. Berkeley, California	93-18 Site I	3195 guinea pigs
Trustees of Columbia University in the City of New York New York, New York	21-35	4 dogs	State of California Berkeley, California	93-25	35 hamsters
Children's Hospital Columbus, Ohio	31-13	4 guinea pigs 2 primates	Stanford Research Institute Menlo Park, California	93-26	20 guinea pigs 133 rabbits
CDC Research, Inc. Clarks Summit, Pennsylvania	23-80	50 guinea pigs 120 rabbits	Alpha Therapeutic Corporation Los Angeles, California	93-155	525 guinea pigs
Texas A & M University College Station, Texas	74-12	239 dogs 7 cats	Colorado State University Fort Collins, Colorado	84-3	20 guinea pigs
Regents of the University of Wisconsin Madison, Wisconsin	35-1	6 guinea pigs 1 rabbit	Eli Lilly & Company Indianapolis, Indiana	32-3	1450 guinea pigs 417 rabbits 17 primates
			Boston University Medical School Boston, Massachusetts	14-17	1 primate
			Toxicity Research Laboratory Muskegon, Michigan	34-54	630 guinea pigs
			University of Nebraska Lincoln, Nebraska	47-04	24 rabbits

First, the unanimous house Committee boldly declared that laboratory animals deserve the care and protection of "a strong and enlightened public" (H. Rep. 91-1651, 91st Cong., reprinted in (1970) *U.S. Code Cong. & Ad News* 5103, 1504). Second, congress expanded the definition of "adequate veterinary care" to include "appropriate use" of pain-relieving drugs during "actual research and experimentation" (84 Stat. 1560, Sec. 14). Further, every research facility would not be required "to show annually" in a report to the Secretary of Agriculture that "professionally acceptable standards" of care are followed in the administration of pain-relieving drugs (84 Stat. 1560, Sec. 14).

Thus, the "good faith" of the 1966 Act was replaced in 1970 by an Annual Reporting system that had at least two important functions: (1) to provide researchers with a means to demonstrate that pain-relieving drugs are used appropriately and in accordance with professional standards, and (2) to further "enlighten" the public about the use of animals in biomedical research. To be sure, the researcher still "holds the key" to the laboratory door, but by virtue of the 1970 amendments, that door was intended to have a "window" in it.

However, administration of the Reporting System is flawed to the extent that neither of these two goals can be met at present. Without adequate definitions of "pain," "distress," and "routine procedures," researchers cannot be said "to show" that pain-relieving drugs are used appropriately. Researcher's parroting of stock phrases supplied by APHIS to explain withholding of pain-relieving drugs compounds the problem.

The Reporting System's secondary goal — to "enlighten" the public — is also hampered by these flaws. As long as key terms remain undefined, data gathered from Annual Reports will remain unreliable and misleading. Explanations for withholding of drugs could provide

the public with important information about how animals are used in research. Instead, the mere repetition of stock phrases reveals little of substance.

Nearly 12 years after passage of the amendment, the USDA has not set any standards or guidelines for terms as crucial to the Reporting System as "pain" and "distress" (9 CFR Sec. 1.1(a)-(rr); VS Memo. 595.19 (1975)). Researchers can hardly be expected to demonstrate that pain-relieving drugs have been used in "painful experimentation" if there is no generally accepted definition of what a painful experiment is. This analysis clearly reveals that researchers performing similar procedures on similar test animals apply different and conflicting standards to determine pain or distress, and categorize animals differently on Annual Report forms, according to their own definitions. The result is that statistical data derived from Annual Reports are unreliable and cannot accurately reflect the use of animals in research.

The current state of scientific knowledge does not permit the setting of an all-encompassing, definitive standard for "pain" and "distress." Nevertheless, changes in regulations and guidelines can enhance the reliability and value of the Reporting System. The term "routine procedures" is also a crucial one in the Reporting scheme, for any procedure deemed to be "routine" is automatically exempt from all reporting requirements. (This procedure, in addition to the fact that rats and mice are excluded from the reporting requirements, explains why APHIS figures are so low.) The study by The Humane Society of the U.S. has revealed that, while some definition has been given this term, "routine," it is inadequate to assure uniform application. Indeed, the examples discussed earlier show that even among APHIS officials, there is disagreement as to whether some common test procedures are "routine" or not.



The 1970 Animal Welfare Act amendments direct that the Secretary of Agriculture "shall require" every research facility "to show" that pain-relieving drugs are used appropriately and in compliance with professionally acceptable standards. In practice, however, for nearly one-third of all animals used in painful research, no explanation (or an inadequate explanation) is provided. APHIS actually exacerbates this problem by encouraging research facilities to use stock explanatory phrases from the APHIS instructional memorandum that are legally inadequate.

Without information as to what kind of product is being tested, and in what way, the use of the suggested explanation is not a "showing," but, rather, a mere statement. For legal purposes, stating is simply alleging, while showing consists of the disclosure of facts. "To show" means "to make apparent or clear by evidence, illustration or other means" (*Kenyon vs. Crane*, 120 F. 2d, 380 (1941)). It has also been said that "showing" is more than a bare assertion; rather, it consists of special explanations and reasons (*Speer vs. Desrosiers* 361 So. 2d 722, 723 (1978)).

For example, the phrase "testing of toxic products required by FDA" is merely an assertion. It is not an explanation, as it does not tie a specific legal requirement of the Food, Drug and Cosmetic Act to the particular research activity of the registrant. Without such additional information, there is no "showing" and APHIS is unable to know whether the Animal Welfare Act is being complied with or not.

## Conclusions

If the reporting element of the Animal Welfare Act is to be properly enforced, APHIS will have to take the following actions.

First, APHIS must issue clear definitions of "pain" and "distress." It is suggested that an experimental procedure should be deemed to involve pain or distress if it includes induction of any pathological state, administration of toxic substances or substances in toxic doses, long-term physical restraint, aversive training procedures, or major operative procedures such as surgery and induction of physical trauma. While this may not cover all of the procedures that may involve "pain and distress," it at least gives substantially more guidance to the individual who must complete the Annual Report.

Second, APHIS should add a further explanatory section to the definition of "routine procedures." Such procedures may still include injections, tattooing, and blood sampling, but should specifically exclude those procedures where, for example, an injection may lead to the induction of a pathological state.

Third, APHIS should require additional information from those who do not use pain-relieving drugs. For example, research facilities should be asked to describe the type of experimental procedure (e.g., ocular toxicity, carcinogen testing, routine batch testing) and state how administration of pain-relieving drugs would have adversely affected the objectives of the research.

# The Silver Spring 17

Andrew N. Rowan

On November 23, 1981, in a Maryland District Court, Dr. Edward Taub was found guilty under a Maryland state anti-cruelty statute of not providing adequate veterinary care for 6 of the 17 monkeys confiscated from his laboratory 2 months earlier. The case has received extensive press coverage and has also caused widespread alarm in the scientific community. According to *Science* (214:121, 1981), "scientists throughout the country have been shocked by the Taub case, initially perceiving it as a bid by antivivisectionists to procure a court ruling against animal experimentation." Taub himself has fostered this impression and has drawn a false analogy between his predicament ("victimization") and the persecution of scientists by religious authorities in the middle ages.

While the case has received extensive coverage in both scientific and animal welfare publications, there are a number of issues that have been glossed over or that have not been addressed at all. Also, most accounts have only concentrated on the events from May to November, 1981. There are some earlier incidents that should be included in the story for a full understanding of its ramifications.

## *Background and Events Leading to the Trial*

At the time of his being charged with cruelty, Dr. Taub, a research psychologist, had been doing research on deafferentated primates for more than 20 years. (The deafferentation process involves severing the dorsal roots of the spinal nerves—the "afferent" nerves that carry sensory input from the limbs to the central nervous system. The technical term for this procedure is "dorsal rhizotomy.") His early research was conduct-

ed under the supervision of Dr. A.J. Ber- man in New York and involved a study of the monkey's use of deafferentated limbs under various conditions (e.g., *Science* 128:842-843, 1958; *Exp Neurol* 7: 305-315, 1963). In the course of his work it was demonstrated that monkeys:

1. Can use a limb in a purposeful manner in the absence of sensory feedback, thereby refuting the general belief at the time.

2. Learn not to use the deafferentated limb and that this learned response can be prevented by physical restraint of the limb.

3. Can overcome some of the effects of deafferentation even when the dorsal roots are cut before birth.

4. Can learn to use deafferentated limbs even when blinded (see *Science* 199:960-961, 1978).

5. Can use deafferentated limbs only clumsily but are still capable of performing difficult movements such as picking up raisins between thumb and forefinger.

Dr. Taub moved to the Institute for Behavioral Research (IBR) in 1968. He has been Director and chief investigator of IBR's Behavioral Biology Center since 1970. Shortly after this, he received funds from the National Institute of Mental Health (NIMH) to pursue research on the "effects of somatosensory deafferentation." In 1977, the funding agency was changed to the National Institute of Neurological and Communicative Diseases and Stroke (NINCDS). According to material from the Smithsonian Science Information Exchange, funding for the project for the 4 years from 1978 to 1981 amounted to \$312,358.

Early in 1977, Jean Goldenberg, a humane society official, visited the lab-

oratory on impulse; she drove by the place daily and had wondered what was taking place. After her visit, she described it as a warehouse with inadequate sanitation, and unsuitable for housing animals. She also learned from Dr. Taub that the laboratory was not registered as a research facility with the U.S. Department of Agriculture. She notified the USDA of her findings and, following an inspection by the USDA, the laboratory was registered on February 23, 1977. Registration is a routine procedure and does not necessarily imply that the laboratory is in compliance. In fact, the USDA inspection on February 14, 1977, conducted by Dr. N.Q. Faizi, recorded a number of deficiencies:

*Floors were dirty and bloodstained and with feces all over them. Much dirt and dust on the cages. Overall colony was stinky [sic]. The bottom pans were filled up with dry and wet feces up to the top. According to my experience and observations these cages had not been cleaned for over a week (USDA Memorandum, April 26, 1977).*

ALEX PACHECO



An article in *New Scientist* (92:672-674, 1981), a British science magazine, notes that Fay Brisk, an associate of Jean Goldenberg's and an animal activist in Washington, reported the conditions at IBR to the National Institutes of Health (NIH). As a consequence of this action,

Jeri Phillips, a veterinarian from NIH, inspected the laboratory early in 1977. His final report noted (1) the absence of an animal care committee and consulting veterinarian, (2) fecal pans that had not been cleaned for several days, and (3) a lack of daily disease checks for the animals. Despite this, the NIH administrative officer, James Prescott, subsequently cleared Taub of the charges of neglect that were cited in Fay Brisk's letter. IBR made a few changes, such as appointing an animal care committee, including Dr. Paul Hildebrandt as consulting veterinarian, and continued with their research. It was at this point, too, that responsibility for funding the project was shifted from NIMH to NINCDS.

After the brief upheaval occasioned by Jean Goldenberg and Fay Brisk, things quickly returned to normal, except for the addition of routine and uneventful inspections by the USDA.

In the middle of May 1981, Alex Pacheco, a student and founding member of an activist group called People for Ethical Treatment of Animals (PETA), started to look for work in an animal research laboratory. According to Pacheco, he felt the need to gain first-hand experience in a research laboratory so that he would have a better understanding of animal-research procedures: Because IBR was close to his home in Silver Spring, he went there first and was taken on as a volunteer after Dr. Taub explained that they could not pay him for his work.

For the next 3 months, Pacheco had free access to the laboratory and was even given a small research project by Dr. Taub, even though Pacheco had no research experience. According to Taub, Pacheco never pointed out any deficiencies to him nor questioned any procedures, although Pacheco stated before a congressional subcommittee that he did question the apparent lack of care as well as the justification for the research project he had been given.

During these 3 months, Pacheco took

numerous photographs of the facility to document his charges of inadequate care. He also took photographs of the facility after a visit by the USDA inspector on July 13. The inspector reported that he found no deficiencies. (Dr. Schwindaman, head of the animal care section at the USDA, testified before congress that the conditions evident in the photographs he had seen did not meet USDA minimum standards.) Dr. Taub then went on vacation on August 21. In the course of the next 2½ weeks, Pacheco took five scientists, including veterinarians and primatologists, through the facilities. All five were horrified at what they saw, and signed affidavits testifying to the poor conditions.

Pacheco then approached the Montgomery County Police and presented his evidence. They agreed that IBR appeared to be in violation of Maryland's anti-cruelty statute (animal research is not exempt from the anti-cruelty code in Maryland, unlike most other states). Accordingly, the monkeys and other evidence were seized on Friday, September 11, under a search and seizure warrant. The monkeys were given a thorough physical examination by two zoo veterinarians from Chicago and San Diego and their report was subsequently used by the prosecution in the trial.

In the course of the next 4 weeks, Dr. Taub and his opponents fought for custody of the monkeys. On September 22, the monkeys were spirited away by animal activists because the judge had decided that they should be returned to Dr. Taub, pending the outcome of the trial. After negotiations between the police and the activists, the monkeys were returned to Washington and, on October 3, were handed back to IBR on the judge's order.

On October 7, the new court-appointed veterinarian, Dr. James Stunkard, told the judge in charge that, after reading the NIH report on what needed

to be done, he did not think that the IBR facilities could be adequately cleaned and that the monkeys should be moved. The NIH report was made public on the same day and noted that IBR had failed to provide adequate veterinary care, that the physical facilities were inadequate, and that on the basis of police photographs taken on September 11, the laboratory was determined to be grossly unsanitary. The report also recommended that the funding for IBR be suspended. The following day, one of the monkeys suffered a cardiac arrest, reportedly while being sutured for injuries sustained in a fight with another monkey. The judge immediately ordered the monkeys to be moved to another Maryland facility, and they were subsequently taken to NIH.

The trial, which began at the end of October, turned on the question of whether or not the deafferentated animals had received adequate care (and not on issues related to this particular type of research). All the scientists who testified (for both sides) agreed that deafferentated animals tend to mutilate their deafferentated limbs, but there was disagreement over whether or not such lesions should be treated and, if so, how they should be treated.

Dr. Taub argued that care of deafferentated monkeys requires specialized knowledge and that none of those testifying for the prosecution—the zoo veterinarians from Chicago and San Diego included—was qualified to set standards for the care of deafferentated animals. Taub also argued that monkeys are messy creatures that soil their quarters very quickly after cleaning. Judge Klavan, who heard the case, was unimpressed by these claims and professed to be deeply concerned at the lack of veterinary care—he found Taub guilty of 6 counts of animal cruelty. Dr. Taub has appealed, and his case is scheduled to be heard on June 14, 1982. In the meantime there are some claims and counter-claims that remain unresolved.

### Care for Deafferentated Monkeys

Dr. Taub has consistently argued that monkeys with deafferentated limbs require special attention and care and that only a few individuals working in the field of deafferentation are knowledgeable about these special requirements. However, there are a number of contradictions and unanswered questions about this claim of Taub's.

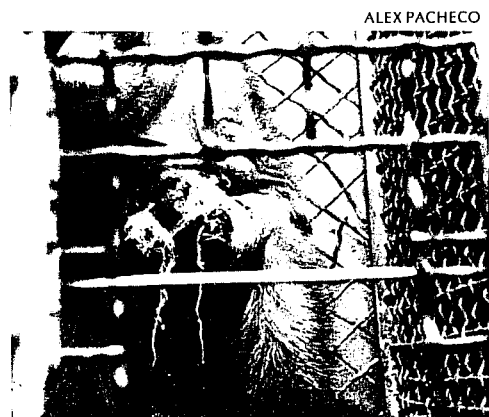
Dr. Berman, under whose supervision Dr. Taub worked, recently noted that "improved methods of caring for deafferentated monkeys kept the limbs of animals in the present study [his own] in excellent condition" (*J Med Primatol* 7: 106-113, 1978). In an interview with *New Scientist* (92:672-674, 1981), Dr. Berman described the procedures used in his laboratory.

Dorsally rhizotomized monkeys are fitted with collars that prevent them from bringing the hand of the deafferentated limb to their mouths during the critical first 6 to 8 weeks after surgery, when hand-biting is a problem. Wounds that cannot be avoided, which occasionally result from uncoordinated movements of the insensate limbs, are washed with soap and water, annointed with an antibiotic ointment, and covered by a bandage that is changed at least every 2 days. In addition, deafferentated monkeys are liable to self-mutilate at any time after surgery if they are stressed. The wounds on the monkeys in Dr. Taub's laboratory had all occurred long after the animals had undergone dorsal rhizotomy.

In a grant application to NINCDS for a further 3-year (1980-1983) renewal of funds for his works on "effects of somatosensory deafferentation," Dr. Taub mentions the problems of caring for his deafferentated animals and notes that "many of these animals, if left to themselves, would rapidly bite off their anesthetic limbs if they were not pro-

tected in a variety of ways and bandaged one or more times each day. The extra care that deafferentated animals require also affects the cost of supplies and daily maintenance" [emphasis added].

Dr. Taub stated (in an affidavit to the court) that he has found, as a result of 24 years of experience, that bandages are "a potentially harmful method of treatment in many situations due to the unique characteristics of monkeys with deafferentated limbs." In court, he noted that he had changed his mind regarding the need for bandaging about 2 years earlier. Two veterinarians who were called in by the defense confirmed this (*Science* 215:745-746, 1982). However, we have not been able to determine whether Taub notified NINCDS of this change, which would presumably affect his cost estimates for the grant application. It is also unclear why, if Dr. Taub had decided that bandages were detrimental, at least one of the monkeys had a bandaged arm at the time of the police action and why bandaging was carried out from time to time on Dr. Taub's orders.



As noted in the editorial in this issue, Dr. Taub has also not been particularly creative about devising preventive measures to protect the monkeys. In 1973 (*Science* 181:959-960), Taub argued that some of the observed regression in mo-

tor ability of some young monkeys was due "primarily to the prolonged wearing of arm bandages which was necessitated by the tendency to self-inflict serious damage on the deafferented limbs by biting and sucking." He then developed a protective suit, which resembled fire-fighting garb. This device left the animals' arms free, but a wire-mesh visor prevented them from putting their hands into their mouths. It is not clear why such garb, with or without appropriate modifications, was no longer being used.

It therefore appears as though at least one expert (Dr. Berman) disagrees with Dr. Taub on the extent and type of care necessary for deafferented animals. Furthermore, Dr. Taub's statements and actions on the bandaging issue are inconsistent. He also admitted in court that he would not have been able to diagnose the osteomyelitis that one of the animals had developed in one arm, which later forced NIH veterinarians to amputate the limb (*Science* 214:1218-1220, 1981). In light of these deficiencies and inconsistencies, as well as the general agreement of most persons who viewed the IBR primate facilities (or the police photographs), that the facilities were filthy, rodent-infested, and "beyond any reasonable standard of acceptable untidiness which might be expected to exist in a busy laboratory" (NIH Report), Taub's claim that he is fit to care for deafferented (or any) monkeys without veterinary assistance should be dismissed as untenable.

Dr. Taub has also claimed that animals feel no pain in their deafferented limbs because the relevant sensory nerves have been cut. In addition, Dr. Rioch, chairman of IBR's Animal Care Committee, has argued that one cannot apply human expectations of pain to animal surgery "because pain is primarily a matter of societal conditioning to which animals are not subject." Dr. Rioch's belief is naive and simplistic. If it is true, all

of the animal models that have been used in the development of analgesics are invalid. Also, even if the animals have no sensation of pain from their deafferented limbs, they may still have systemic suffering since infection from the arms could still affect the rest of the body.

Other researchers in the field appear to disagree with the claim that deafferented animals feel no pain. Levitt and Levitt discuss the deafferentation syndrome at length (*Pain* 10:129-147, 1981) and note that the syndrome is also produced in dorsally rhizotomized macaque monkeys. They state that "the syndrome of rhizotomies is indicative of a chronic neuropathological pain" and even cite research by Taub on rats (*Exp. Neurol* 54:33-41, 1977) which apparently supports such an inference. What this research indicates is that the animals in Taub's experiments, although deprived of sensory innervation, may nonetheless have continued to have a very real perception of pain in those limbs, and reacted to the persistent irritation by mutilating themselves.

Four of the seized monkeys required immediate veterinary attention and, in the opinion of the zoo veterinarians, displayed conditions that had developed over a considerable period of time. There were several unhealed fractures, and the monkeys had symptoms of gross infection such as draining lesions, purulent holes, or greatly enlarged lymph nodes. One does not need much veterinary expertise to judge such conditions as unacceptable under any circumstances.

Concerning the question of the unsanitary conditions of the laboratory, Dr. Taub and some of his colleagues appear to believe that it is virtually impossible to keep monkeys in clean and sanitary conditions. For example, a colleague on the research project, Dr. Michael Goldberger from the University of Pennsylvania, stated that "I saw nothing I wouldn't expect to see if I went

around the country looking at primate colonies" (*Science* 214:1219, 1981). Dr. Taub did admit that he had a housekeeping problem during his vacation and alluded repeatedly to the fact that one technician failed to feed the monkeys or clean up on 7 of the 20 days when Taub was away, including the 2 days before the police raided his laboratory.

The NIH reviewers who found the conditions of the laboratory grossly unsanitary were, however, surely capable of distinguishing between transient accumulations of dirt and feces and cages that appeared not to have been cleaned for months. It does Dr. Taub no good to argue that the conditions in his laboratory are comparable to those in other similar facilities. Laboratory animal veterinarians and other researchers are only likely to find his comments insulting (*Lab Anim* 11(1):7, 1982).

In the 1980 grant application, Dr. Taub quotes a \$0.55 per diem cost for looking after each monkey. A further \$400 was requested for veterinary supplies. A per diem cost of \$0.55 is very low for macaque monkeys. According to Dr. O'Donnell, Acting Director of NIH's Division of Research Resources, the average per diem cost for cynomolgus monkeys ranges from \$2.50 to \$4.00 (Testimony on 1982 NIH Appropriations, House Subcommittee on Appropriations, p. 1392). It is unclear why Dr. Taub estimated such a low per diem for his cynomolgus monkeys, especially considering the extra care required, and supposedly provided, for the deafferentated monkeys.

### *The Responsibilities of the Attending Veterinarian*

When IBR was registered as a research facility with USDA in 1977, the Institute was required to appoint an "attending veterinarian." The duties of this individual are not set out in any detail by USDA, but once a year he or she must

sign an annual report form and "certify that the type and amount of analgesic, anesthetic, and tranquilizing drugs used on animals during actual research, testing, or experimentation *including post-operative and post-procedural care was deemed appropriate to relieve pain and distress for the subject animal.*"

Dr. Paul Hildebrandt had agreed to act as attending veterinarian for IBR but, as he explained to the NIH review committee, he had always considered his role vis-a-vis IBR as that of a consultant. However, his services were not required very often: as admitted by Dr. Taub, no veterinarian had been called in to help or advise IBR for 2 years. Dr. Hildebrandt noted that, on his annual visits, the monkeys appeared to be lively but he conceded that, as a pathologist, he had had little experience with research animals of any sort, or with primates in or out of the laboratory.

It may be that "attending veterinarians" from outside the research institution provide little more than a professional rubber stamp for the relevant research facility. As far as the Animal Welfare Act is concerned, they are required to do no more than sign their name in the appropriate blank space on an annual report form. A recent editorial in the newsletter of the American College of Laboratory Animal Medicine (January, 1982) notes that it was reported that no veterinarian saw the monkeys for 2 years and that, if this is true, USDA and NIH need to review their procedures further. However, the editorial also notes that "we in ACLAM should bear some of the collective responsibility: have we pressed the AVMA for a clear statement on professional and ethical obligations in signing USDA annual reports? What does attending veterinarian mean in practical terms?"

It is indeed time to establish some sort of code of conduct for the "attending" veterinarian, perhaps encouraging more frequent attendance (monthly?) at

the laboratory as well as requiring actual supervision of the animal care staff. In addition, the attending veterinarian and others who sign the annual report forms should be more aware of their specific legal responsibilities.

### *The Role of the USDA and the NIH*

From the time that the animals were seized from his laboratory by the police, Dr. Taub has consistently claimed that he was merely maintaining what, he thought, were acceptable standards of care. His opinion about this had been corroborated by the results of the USDA and NIH inspections. After the initial inspection by Dr. Faizi, the USDA inspector consistently noted no, or only minor deficiencies. Dr. Perry had taken over from Dr. Faizi and it was clear from Perry's performance in the courtroom that he had little knowledge of, or interest in the Animal Welfare Act regulations. As a further wrinkle, APHIS officials admitted during congressional testimony that the photographs of the laboratory which they had seen did not indicate compliance with the regulations. At NIH, despite Dr. Phillips' unfavorable report in early 1977, subsequent reports noted that "the facilities for the research are well suited for the proposed project" (1/11/79) and that "the facilities for the behavioral work have been built up over many years and are excellent" (10/18/79).

Not unjustly, Dr. Taub asks why NIH has suddenly decided that his facilities are inadequate when they have considered them to be satisfactory for the past 9 years. Part of the answer may be found in testimony from Dr. J. Simms, who visited the facility in February 1979 to review the research for NIH. She noted that her comments (see above) in the report referring to the facilities were merely routine and that the animal quarters had not been specifically inspected.

At the October congressional hearings on animal experimentation, Dr. William Raub of NIH was given a particularly tough grilling by congressmen on the question of how IBR had escaped detection. Under their questions he admitted that the system had failed and announced that NIH intended, in the future, to include animal care as a responsibility of site visit teams. They also planned to make unannounced surprise visits to randomly selected institutions to protect against a similar occurrence.

The evidence clearly indicates that both the USDA and NIH were given due notice that there might be problems at IBR. However, neither followed up on the early reports. Pacheco cannot be faulted for not taking his observations and concerns to NIH or USDA. Their past record did not give him any reason to believe that they would have taken firm action to correct the situation. On the other hand, once they had been made publicly aware of the situation, NIH officials proceeded with commendable speed and suspended Dr. Taub's grant after satisfying themselves that there was cause for serious concern. The USDA, on the other hand, displayed customary indecision when confronted with yet another problem in a registered research laboratory. They now claim to be revising their inspection procedures to prevent a further occurrence of this sort and have also undertaken a review of the other laboratories inspected by Dr. Perry.

### *The Scientific Issues*

While the actual case has turned *solely* on the quality of the care provided to the animals, Dr. Taub has attempted to strengthen his position by referring to the scientific value of his work. For example, in an affidavit to the court, Dr. Taub notes that the seizure of the monkeys represented not an attack on his lab in particular but "an overall attack



on medical research as it is conducted throughout the world today." In fact, this allegation is supported by Pacheco's own comments. After Dr. Taub's conviction, PETA issued a statement to the press which notes that Pacheco viewed the legal victory as a stepping stone. He is quoted as saying that "now we must face the question of whether it is justifiable to use animals in experimentation at all." However, Pacheco's intentions in bringing the case against Dr. Taub do not affect the merits of the case one whit. Nevertheless, several of Taub's colleagues have pursued this red herring and have already established the Biomedical Research Defense Fund to support any scientists who find themselves the targets of similar protests by animal activists.

As for Dr. Taub's own work, it has been lauded by several scientists. Dr. John Basmajian, Director of Rehabilitation Medicine at Chedoke-McMaster Hospital in Hamilton, Ontario, has stated that "Dr. Taub's findings have greatly clarified mechanisms of recovery and motor retraining and continue to provide clinicians with improved understanding of the potential for neuromuscular recovery..." (*New York Times*, October 6 1981).

However, Taub himself notes of one of his discoveries, that of learned nonuse of the deafferentated limb, that "the long-enduring component of motor impairments following CNS damage in humans is frequently due to motivational and learning factors" (1980 Grant Application Renewal). Thus, his results in animals support and confirm observations already made in humans (a not uncommon result of animal research) although his data also suggest new kinds of clinical therapies that appear to have some potential.

Despite Taub's supporters, who affirm that his research contributions have been gained "at a relatively small price

in terms of animal suffering" (*Baltimore Sun*, November 9, 1981), there are some legitimate questions that can be asked about the approach used in the kind of research performed by Taub.

Dr. Taub's 1980 renewal grant application proposed studies that would attempt to quantify the deficit in movement and learning produced by brachial dorsal rhizotomy. One could criticize this as mere parametric tinkering, because so much of the neuronal mechanism of control of movement in deafferentated limbs is unclear at this time. Quantitative measures are unlikely to clarify the situation. As the Neurological Sciences Study Section noted in turning down another Taub grant application for research on fetal origins of sensory motor integration, "The issues under attack here are poorly understood...is it appropriate to pursue studies requiring extraordinary surgical manipulations on few animals at great expense?" (December 20, 1979). Certainly, there are many things that can be measured, but that does not mean that they *must* be measured.

A fairly large proportion of the proposed behavioral tasks described in the funded Taub project involved prehension tests that required the animal to use its fingers. However, the veterinarians who inspected the monkeys after the police seizure recorded that 39 of 55 digits on the deafferentated limbs were either missing or deformed. Presumably, Dr. Taub would have had to submit yet more monkeys to dorsal rhizotomy in order to study the prehension tasks proposed for the next 3 years. From our point of view, the need to use more animals would largely be the result of poor postoperative care and thus cannot be justified.

### Conclusion

Apart from the fact that animal research laboratories are now likely to be more careful in their hiring of part-time

summer help, what has been learned from the case of the "Silver Spring 17"?

First, it is clear that the Animal Welfare Act does not necessarily ensure satisfactory standards of care and housing for research animals (even assuming that a bare 15-ft<sup>3</sup> cage is a satisfactory home for a monkey). It is also clear that NIH's much-touted *Guide for the Care and Use of Laboratory Animals*, even when supported by their other mechanisms for maintaining standards, did not guarantee adequate care or housing. NIH is currently looking at ways to upgrade their animal welfare programs, but these are unlikely to allay the concerns of animal welfare organizations as long as representatives of the concerned public are excluded from any form of oversight or participation.

Second, it is not appropriate to ignore wounds and lesions on laboratory animals, regardless of whether or not the animals feel pain. If scientists do research where the animals are likely to self-mutilate or injure themselves for whatever reason, then there must be an earnest and continuing search for solutions to the problem.

Third, under the Animal Welfare Act, institutions which do not employ a veterinarian full-time to care for the laboratory animals must obtain the ser-

vices of an "attending" veterinarian. It is clear that the duties and responsibilities of the attending veterinarian need to be described in more detail. Perhaps certification by the American College of Laboratory Animal Medicine should be a requirement for all attending veterinarians.

Finally, the problem of weighing the scientific questions against the ethics of animal research will always be with us. This case has not helped to advance the quality of the debate, although it has served to alarm a significant number of biomedical researchers. The revelations of the case also encouraged congress to address the question of regulation of animal research with more commitment and served to destroy the usual defense put forward by NIH and USDA—namely, that their standards are sufficient to safeguard the welfare of laboratory animals.

The 1966 Laboratory Animal Welfare Act was passed, in part because a stolen dog ended up in a laboratory and a *Life* reporter did an expose of the prevailing conditions in dog dealer facilities. Perhaps the Taub case will stimulate further congressional action to regulate laboratory animal welfare.

*(An editorial comment on the Taub story is featured elsewhere in the Journal.)*

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## FORTHCOMING ARTICLES

Alternatives to Animal Experimentation—Steven Niemi

Deep Woodchip Litter: Hygiene, Feeding, and Behavioral Enhancement in Eight Monkey Species—Arnold S. Chamove et al.

Abundance and Distribution of Large Mammals in Upper Ogun Game Reserve, Oyo State, Nigeria—T.A. Afolayan et al.

The Future of Research into Relationships Between People and Their Animal Companions—Boris M. Levinson

Historical Trends in American Animal Use and Perception—Stephen Kellert and Miriam O. Westervelt

# Original/Review Articles

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## Urban Wildlife Habitat— Present and Future

David Tylka

*Many kinds of wild animals can become adapted to living in cities, provided that the right kinds of habitats are available and that their presence is accepted by city-dwellers. Suitable habitats can be furnished by traditional parks, tracts of "wild acres" set aside by cities, linear parks, cemeteries and golf courses, and transportation corridors. Buildings, rooftops, and institutional grounds can also provide habitat for animals like birds and butterflies. Suburban areas can encourage the growth of local wildlife by neglecting to mow common grounds, or allowing sections of individual lawns to grow up with wild vegetation.*

### Zusammenfassung

Viele Arten von wilden Tieren können sich an das Leben in Städten gewöhnen, vorausgesetzt dass die richtigen Arten von Habitat vorhanden sind und dass die Anwesenheit von Tieren von den Städtern akzeptiert wird. Angemessener Lebensraum kann durch traditionelle Parks oder wildnisartige Landflächen von den Stadtgemeinden bereitgestellt werden; ebenso durch "lineare" Parkanlagen entlang Wasserläufen, Friedhöfe und Golfplätze und bepflanzte Durchgangsstrassen. Gebäude, Dächer und Anlagen im Umkreis von Gebäuden eignen sich auch als Habitat für Tiere wie Vögel und Schmetterlinge. In den Vororten kann das Gedeihen von Wildtieren durch Unterlassung des Mähens von Gras auf Gemeindegrund oder durch Förderung wilden Pflanzenwachstums auf privatem Grund.

### Introduction

I'm proud to be an urban biologist. I am part of a small but increasing number of common biologists who are situated in metropolitan areas across the country. I believe that, with sufficient education of urbanites, these city biologists can have some impact on our lifestyle.

In this paper, I will discuss urban wildlife—wild animals found in and around cities and towns—small animals and large animals, warm-blooded animals and cold-blooded animals. What

do all of these urban animals have in common? They have adapted to living around people. Generally speaking, animals in the city are those that have resisted extermination or those that occupy niches that are compatible with human interests. Wildlife generally fits into this latter category. In fact, many studies have revealed that the presence of wildlife in urban areas is not only compatible with the presence of people, but is even highly desirable (e.g., Brown *et al.*, 1979; Kellert, 1979; Witter *et al.*, 1981).

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*Mr. Tylka is an urban biologist at the Missouri Department of Conservation, St. Louis Metro Office, 1221 S. Brentwood Blvd., St. Louis, MO 63117. This paper was presented at the Symposium on Wildlife Management in the United States sponsored by the Institute for the Study of Animal Problems on October 14, 1981, in St. Louis, MO.*

Where is urban wildlife found? To respond simplistically, urban wildlife is found wherever there is a suitable wildlife habitat. If one analyzes the urban environment, it will be noted that a large amount of habitat diversity exists in metropolitan areas. A vegetative cover map of Kansas City, MO, was developed under the direction of the Kansas City urban biologist, Joe Werner. This map indicated where various types of wildlife habitat exist and also where most of the wildlife management opportunities can be found.

I would now like to discuss what I consider to be the main categories of wildlife habitats that can presently be found in the urban environment across the country, and to use examples that I am familiar with to illustrate these categories. Finally, I would like to discuss the future of urban wildlife management and how this urban resource can be enhanced.

### *Present Categories of Urban Wildlife Habitat*

#### *Traditional Parks*

When traditional parkland has been acquired in cities, all the understory is typically removed and then maintained in mowed grass and big trees—a condition referred to by many biologists as the “neatness syndrome.” There are a few urban animals that can adapt to this traditional park, especially if people bring food into the park and if there is water available from a source like a leaky drinking fountain.

In a few of these traditional parks there are sections that have been allowed to retain some natural quality—wilderness sections where wildlife can proliferate. Most of these wilderness pockets in traditional parks exist simply because the area cannot be easily maintained, such as the wooded ravine in O’Fallon Park in North St. Louis. The creek in this ravine is one of the few

areas in this part of the city where children can go to get their feet wet while chasing a frog. The only planned wilderness area in any of the parks in the city of St. Louis is a 90-acre portion of Forest Park named Kennedy Woods. The vegetative diversity of Kennedy Woods makes it the “hottest” birding area in the city, especially for warblers.

#### *Urban Wild Acres*

In Missouri, a new program called Urban Wild Acres has been initiated by the Missouri Department of Conservation. Natural areas such as Steyermark Woods in Hannibal, MO, are purchased and set aside as urban wildlife habitat and for activities such as nature enjoyment and environmental education. As urban development continues, the importance of these Urban Wild Acre tracts will increase as people become more reluctant to drive long distances to enjoy natural, outdoor experiences that are available close to home.

#### *Linear Parks*

Through good urban, open-space planning—or through neglect of nondevelopable land—many municipalities across the country have allowed areas along watercourses to remain natural, whereas other cities have officially designated these sections as linear parks. Denver and its surrounding communities have developed linear “greenbelts” along some of the creeks and rivers. These greenbelts not only protect the character of the natural watercourse and furnish excellent wildlife habitat, but the linear configuration also lends itself to many recreational pursuits not easily provided by rectangular parks. Rock Creek Park in Washington, DC, is another fine example of a linear park. Here, wildlife observation, nature appreciation, and hiking are facilitated by trails maintained by the Potomac Appalachian Trail Club.

Linear parks can also be situated along larger rivers. Across the Missouri River from St. Charles, MO, is a floodplain linear open space called the Earth City Greenbelt. Many riparian species of animals can be observed here.

Looking for a site for a pilot linear park project in St. Louis County, public and private agencies studied the four major creeks of the area. A 3-mile section of Gravois Creek that runs through the industrial and residential areas of South St. Louis County was chosen, and the properties along this creek are now being purchased.

#### *Cemeteries and Golf Courses*

Although many cemeteries and golf courses have been landscaped with ornamental shrubs and large trees, with all of the other vegetation trimmed away, some of these plants can offer limited benefits to wildlife. However, in those areas of cemeteries and golf courses where there is some understory vegetation nearby, wildlife species may abound. In Boston and its suburbs, cemeteries make up 35 percent of the existing open space; and 4 of the 50 cemeteries of that vicinity have wildlife management programs (Thomas, 1974).

Many golf courses have been carved out of the woods, and the rough along the fairways has remained fairly rough and undisturbed—undisturbed as long as one keeps the ball on the fairway. In Denver and in many other cities across the U.S., the waterholes are meccas for geese and ducks.

#### *Transportation Corridors*

Roadside plants along boulevards, streets, and interstate highways offer some wildlife habitat. Kestrels commonly patrol the medians of highways in search of insects or mice. It would benefit more wildlife (not to mention the fuel and manpower savings) if just a strip of vegetation close to the road would be

regularly mowed. Along some stretches of roadways, mowing is impractical, so beautiful flowering plants grow up wild, thereby furnishing nectar sources for animals (at least until these plants are sprayed with herbicides).

Railroad right-of-ways sometimes provide the greatest diversity of plants found in the urban area. Certain butterfly and moth species that utilize only particular plants as larval sources can be observed along railroad tracks.

#### *Building, Rooftops, and Institutional Grounds*

Some building designs are destined to have animals attracted to them. Items such as vents, ledges, and chimneys, if not properly designed, constructed, or maintained, can furnish roosting or nesting spots for birds. It would probably be expensive to install a chimney guard over a school's boiler room chimney. Chimney swifts thus have access and commonly roost in tall school chimneys. It is believed that kestrels will fly into these chimneys to prey upon these swifts.

Various potted flowers and shrubs on rooftops can attract wildlife such as butterflies. Other winged creatures, such as nighthawks, may be found on the flat, rocky surfaces on the top of some buildings.

Landscape plantings on institutional grounds and around buildings may provide limited food and cover. Concrete pools on these grounds, such as this one located in front of the Department of Interior Building in Washington, DC, can support birds and turtles, if managed properly.

#### *Water Impoundments—Lakes, Sediment Ponds, and Storm Water Retention Facilities*

An urban lake can provide wildlife habitat for a few animals. However, cutting the vegetation right up to the water's edge and designing the lakes as deep-

water structures will limit the number of wildlife species that can use them.

Sediment ponds are usually designed as temporary structures to hold the sediment that runs downhill from a construction site. They are normally drained after construction is completed—typically, just about the time when vegetation starts to grow up and increase the diversity of habitat available to wildlife.

Some cities and towns now require storm water retention facilities in new developments. If these structures are designed as permanent shallow ponds or marshes, they represent a tremendous potential for inhabitation by wildlife.

#### *Suburbia—Common Grounds and Private Residences*

A substantial portion of the land within most metropolitan areas is residential, and the vegetation here is as diverse as the people. Typically, however, many housing developers have started off by leveling and denuding the land completely before building. Today, though, some developers have begun to lay out their projects according to the lay of the land and consistent with the slope of the watershed. Whenever possible, developers should conserve the topsoil, prevent undue erosion, and remove only that vegetation which is essential for construction.

Some developers take advantage of the existing natural vegetation on common ground. Homeowners in a subdivision in Columbia, MD, voted to discontinue mowing portions of their common grounds and allowed wild plants to invade these areas. These homeowners not only enjoyed the wildlife associated with these patches but also appreciated the reduced maintenance costs.

Homeowners can also enjoy a substantial savings of both time and money by permitting sections of their yards to remain natural. This natural lawn con-

cept has been incorporated into city ordinances.

Enhancing the wildlife habitat in the yard was the objective for creating the slide and tape program entitled "Backyard Wildlife." This program is used to explain some generalized concepts of wildlife management techniques around houses to homeowners associations, civic groups, sportsmen's clubs, church groups, and nature organizations. The program is available from the Natural History Section of the Missouri Department of Conservation, St. Louis, MO.

#### *Future*

This "Backyard Wildlife" program is only one small step in the process of making urban residents aware of the opportunities for enhancement of wildlife that are possible. At this point, however, we can only give recommendations about urban wildlife management that are based on observations, traditional wildlife management practices, trial-and-error experiences in urban settings, and common sense.

The task of categorizing urban wildlife habitats is only a beginning. We now need to take a detailed inventory of these habitats, to determine what factors are operating within these habitats, and to discover how these factors jointly influence urban wildlife populations. We must also investigate what factors, such as wildlife corridors, are operating outside of these habitats to affect urban wildlife populations.

Along with these research endeavors, we need to educate the public about urban wildlife. Health departments, humane societies, parks departments, nature organizations, and conservation agencies have a responsibility to inform the urbanite that providing urban wildlife habitat benefits people as well as wildlife. We also have a duty to teach urban

residents that animals such as bats and garter snakes are interesting and beneficial animals. They should be understood and appreciated and should not end up cut up into pieces inside a coffee can. And, to inform the public, we will have to become better informed ourselves.

Urbanization is here to stay. About three out of four people in the U.S. live and work in cities and towns and spend most of their lives there. How dull cities would be without wildlife habitat and the associated animals. A wealth of information concerning urban wildlife is yet to be discovered. By investigating and understanding the factors influencing urban wildlife habitat, humans can live in closer harmony with nature within the urban environment of the future.

## References

- Brown, T.L., Dawson C.P., and Miller R.L. (1979) Interests and attitudes of metropolitan New York residents about wildlife. *Tran N Am Wildl Nat Res Conf* 44:289-297.
- Kellert, S.R. (1980) Activities of the American Public Relating to Animals, USDI Fish and Wildlife Service, Washington, DC.
- Thomas, J.W., and Dixon R.A. (1974) Cemetery ecology, In: *Wildlife in an Urbanizing Environment: a Symposium*, University of Massachusetts, Amherst, MA.
- Witter, D.J., Tylka, D.L. and Werner J.E. (1981) Values of urban wildlife in Missouri. *Trans N Am Wildl Nat Res Conf* 45; in press.

*When Dr. Neil Wolff, of the Association of Veterinarians for Animal Rights, published an article in the November 1981 issue of Modern Veterinary Practice on "The Hunting Veterinarian," one reader commented, "Boy, is this guy going to get letters." And indeed he did. A sampling of the responses:*

**I**, like most of our profession, detest the waste of animal life, but when that life has served mankind I am not remorseful if it ends. I'm not sure who in Dr. Wolff's group determined what the rights of animals were, if any, but long before either of our times we were given the instructions by our Creator that man has dominion over the Earth. If killing or the destruction of any life is the question we surely must consider the prohibition of lawn-mower sales, chain saws, insecticides...

**A**nimals have the rights we have given them. Species are treated differently according to how they benefit us.

**T**he majority of veterinarians I know are hunters, and they seem to enjoy the hell out of it. I certainly don't think any less of them for doing it...I believe you shouldn't say you don't enjoy something until you've tried it.

**I** feel quite certain that the hunting veterinarian will also be found to be the same one who supports his church, civic, and school activities.

**I**f one accepts the rights of animals as postulated by Dr. Wolff, how can the question of euthanasia ever arise?...Whatever the euphemism: euthanasia, humane slaughter, or sport hunting, the results are equivalent. Killing is killing.

# Some Thoughts on the Laboratory Cage Design Process

Margaret E. Wallace

*A block to progress in the design of cages and other restricted environments for animals has been the notion that animal and human needs are necessarily in conflict. The process of design should list the established and suspected animal needs separately from a list of human needs — husbandry and experimental. Comparison of the two lists will often show up more compatible needs than expected, and design features can be worked out to fulfill them. Adjustments may then be made where needs are less compatible until "sufficient" compatibility is achieved. An innovative design for a mouse cage is described, to show that this process can lead to harmony, new observations on animal needs, and to unforeseen benefits to both animals and humans.*

## Zusammenfassung

Ein neuartiger Mäusekäfig, der Cambridge Käfig, wird hier beschrieben. Dieser Käfig hat die folgenden Vorzüge für die Tiere: genügend Raum zum Nisten, gute Lüftung ohne Zugluft, Reduktion von Licht und Lärm, freier Zugang zum Wasser und weitläufiger Bewegungsraum. Die Vorzüge für den Menschen sind niedriger Preis, einfaches Säubern und Unterbringen sowie mehr entwöhnte Junge per Weibchen, Anpassungsmöglichkeit der Zusatzteile, wie sie für Verhaltensexperimente notwendig sein könnten, und relativ geringe Heizungskosten zum Warmhalten der Nester.

## Introduction

In the third edition of the UFAW handbook (Tuffery, 1967, p. 297), there is a section on "The Cambridge Mouse Cage," which describes "an important advance in the design of cages" that takes as its starting point "the mouse's wishes and convenience, as deduced from behaviour studies." Clearly, this prestigious guide to the care and management of laboratory animals was recommending that the users of the guide take note of a proposed advance in the conceptualization and design of mouse cages. However, as far as I am aware, no one has taken much notice of the handbook's recommendation. By hindsight, one can surmise that this has occurred because of ambivalence about considerations of animal welfare.

The present article outlines the sort of thinking process that ought to underlie the design of all restricting environments for animals in the 80's, when one hopes that it has at last become respectable to consider animal needs as well as those of human beings. In this paper, I have taken as an illustration of this concept the very breeding cage described in the UFAW handbook mentioned above.

## Needs in Conflict

One block toward progress in improving cage designs has been the assumption that human and animal needs must necessarily be in conflict. For example, humans must restrict the activity of their animals, whereas the animal wants freedom; humans want disease-free ani-

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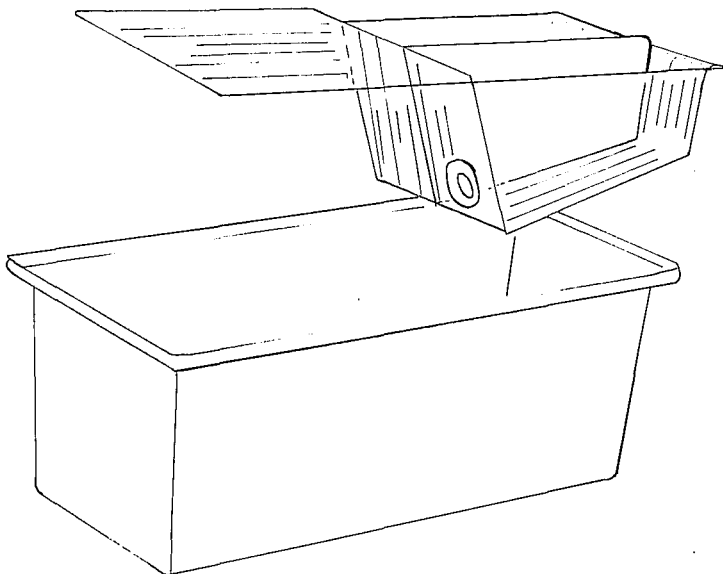


mals, but the animal's behavior in relation to excretion is unhygienic; humans want a cage that is easy to clean, store and assemble, but an animal wants his "micro-environment" to be "natural," and natural environments do not lend themselves to easy handling.

This block led, in instances where the animal's needs were considered, to a design that largely thwarted humans. Jewell (1964) was probably the first to consider a mouse's actual needs. His design included a nest area and a separate exercise area; but it was costly, unhygienic, and difficult to wash, store, and assemble. The design also proved less than ideal for the mouse—but this deficiency occurred because investigation into mouse needs had simply not gone far enough (Wallace, 1981a). It appears as though Jewell's cage was not perceived by the scientific community as a move in the right direction. Or, if it was seen as a real advance by people who had humane ideas, these ideas were con-

sidered by many to be unscientific at the time of Jewell's work, and no one had sufficient interest to do much more investigation into an area like improved cage design.

When I was asked in 1959 to set up a mouse breeding laboratory, and encouraged to put my own ideas into it, I was very unsatisfied with current cage designs. I did not know where to start to work on improving them, but a particular comment implying an inevitable *thwarting* of human ends indicated a potentially fruitful direction to follow. The comment was about a typical "shoe-box" mouse cage (Fig. 1), "But even this one, where the bottle is well off the cage bottom, gets too damp because the mice *will* tend to build their nests up to the bottle spout, and the water siphons out." I was also shown a shallow cage, with the comment: "This one not only siphons out, [but] the mice [also] shore sawdust over the sides of the cage and make a mess on the laboratory floor."



**FIGURE 1.** A typical modern mouse cage. Note its "shoe-box" shape. The lid is basically a flat wire sheet bent in three places to form a trough, with two compartments separated by a fixed divider. There is no shelter, and the area under the two compart-

ments is too high (3 cm) at the ridge for making a snug nest area. It fits onto a deep, narrow-rimmed plastic box. The overall internal dimensions of the box are: 30 cm x 12 cm x 12 cm (height); volume, 3,120 cc.

It occurred to me that in these kinds of cages the needs of the mice were being thwarted equally as much as the needs of humans. That is, in shovelling sawdust around, the mice were trying to achieve something that the designers had made impossible: a "snuggable" nest area in which manipulation of the bedding provides a nest whose temperature can be controlled by the mouse. The provision of bedding was useless unless the mice could use it to construct such an area. I have since been sent a photograph (see Barnett, 1975) of a rat's attempt to achieve the same effect in a typically "unsnug" rat cage.

I then tested this idea using mice of

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**FIGURE 2.** *The Cambridge cage.* The lid is basically a flat expanded wire sheet, bent in three places to form a trough, with a relatively large food compartment separated by a removable divider from the bottle compartment. There is a shelter formed by a solid sheet placed on the shallow slope of the food compartment, and the area under the food compartment is low enough (2.2 cm) at the ridge so that the nest area under the shelter can be made "snug." It fits onto a shallow smooth-rimmed plastic bowl. The overall internal dimensions of the bowl are: 27 cm x 22 cm x 8 cm (height); volume, 4,750 cc.

many strains. Only some of the results of these experiments were published, as there was no interest in the topic at the time, but the most successful design was described in a series of papers that quoted figures quantifying success in the terms that were then exclusively acceptable: mouse productivity, low labor input, and low capital cost of production (Wallace, 1965, 1968; Wallace and Hudson, 1969; and Wallace, 1971a). The final version of my cage is known as the "Cambridge cage" or the "Wallace design" (shown in Fig. 2 and 3, with a mouse and litter in occupation). (Cages meeting these design criteria may be purchased from Cope and Cope Ltd., 57 Vastern Road, Reading, U.K., or Philip Harris Biological Ltd., Oldmixon, Weston-Super-Mare, Avon, U.K.)

### *Needs Must Be Considered Dispassionately*

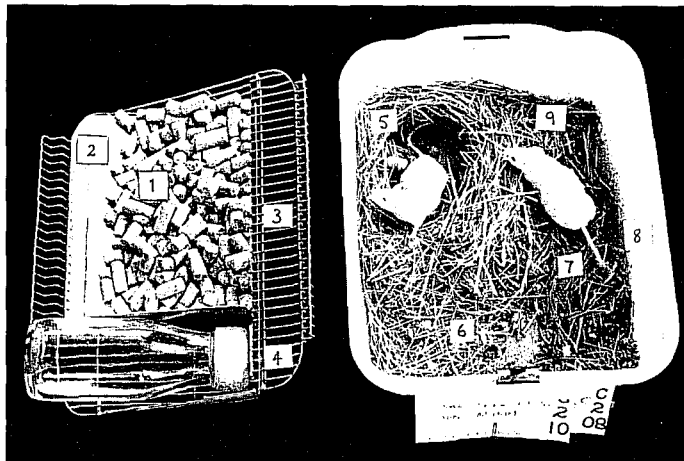
I hope that, in today's climate, human and animal needs can be looked at dispassionately, without assuming that these needs must necessarily be in conflict. The process of design should be studied and better ways found for testing the design against both human and animal needs, initially ignoring the question of compatibility. Then, when both sets of needs have been investigated and listed, the question of compatibility can be tackled as an exercise in its own right. This will lead to progressive adjustments in design within the limits imposed by each set of needs, until sufficient compatibility is achieved. The word "sufficient" is important. Complete compatibility is never achieved, but there comes a point in making changes in design when the cost of further improvement threatens to outweigh the further benefits that can be achieved in the light of present technology and of our current understanding of animal needs. Any "sufficiently compatible" design should be described in ways that indicate areas worthy of further research.

### Needs Which Are Compatible May Even Be in Harmony

A design that achieves sufficient compatibility between human and animal needs has *had* to incorporate an understanding of the broader issues in animal ethology. Other areas that are not sufficiently understood will then become apparent, because the new design will permit the observation of behaviors that have not previously been studied. Once these are recognized, the design itself

may be amenable to further improvement or, as in my design, it may be found that the design is already compatible, without any need for alteration, with new kinds of ethological observations. That is, there may be a harmonizing of human and animal needs in the “sufficiently compatible design,” an unexpected, and therefore pleasing, development.

Such a serendipitous outcome occurred in the designing of the Cambridge cage when a “snuggable” nest area had been provided, and the mice began to



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**FIGURE 3.** *The design features meeting mouse needs.* (1) The food (hard pellets) in the overhead trough is accessible through the *upright* bars. The space between the bars allows manipulation by paws and jaws. (2) The shelter excludes drafts all round the area above the nest: it and the nest area (5) form a tunnel opening at the end under the bottle. The shelter also reduces light and noise. (3) Access to food and water is on the right side only, so that the unsheltered part of the wire frame (3) allows ventilation of this area, where excretion occurs (7 and 9); on this open side the mice can hear and smell other mice in neighboring cages. (4) The capillary tube allows easy access for drinking, is too narrow to allow pollution by mice or bedding, is low enough for the smallest weanling to reach, and does not drip unless the cage is severely jolted. (5) The nest area, with nest opened to show young inside. Mice lower the nest temperature as the young grow, by enlarging the aperture of the tunnel (2) at the point where they leave the nest for food and water. Note that there are no excreta in the nest area, and that mice have built the bedding up to the ridge of the trough (when the lid and shelter are on) and up inside the nest area, thereby excluding drafts from under the trough. Mice nest under the bottle per-

sistently only if the wall holding the racking is cold (e.g., an outside wall with no insulation). The wood-wool is pliable and chewable: the mice have lined the nest with smaller softer pieces. (6) The area under the bottle is not used by the mice for nesting (as in other cages where this causes the water to siphon out), but instead, they keep the bedding here pressed down for egress to the activity area (7). (7) The right side of the cage, with the front (6), form an activity area and the mice excrete on this side (7 and 9), where it is well ventilated (3). The whole floor area is larger than in other cages of similar volume, thus maximizing the available activity area. (8) The sides of the bowl are high enough for “looping the loop” in the exercise area (a possible response to confinement), grooming and social encounters; they are lower than other cages of similar volume, thereby maximizing ventilation through the open bars. Wild mice thrive and breed better in this cage than others: restriction of activity seems to be the only cause of trouble (see Wallace, 1981, which emphasizes the importance of the shape and size of the activity area). (9) Urination spot: mice usually choose this site. The sawdust along this side is absorbent, which prevents excreta from being carried on the feet to other parts of the cage.

confine their sawdust shovelling to the sides of this area; it was then observed that the mice exited chiefly at one end of the area. The observation of this behavior was utilized in completing the design such that the whole cage could be kept dry. The areas of access to food and water were placed so that the use of this chief exit ensured that the mice kept the spout of the bottle free of bedding as they squirmed under it. In addition, a user of the cage design pointed out that the dip in the center of the cage lid provided some barrier to the onslaught of dominant animals in male store cages, thereby reducing fighting.

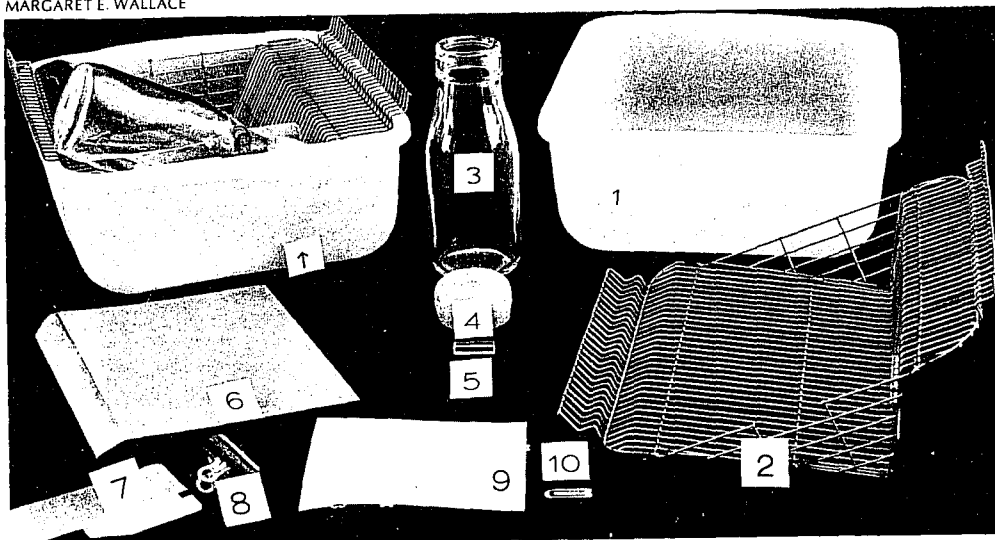
Again, tests of different "shelter" materials, in which observations were made on the relationship between these materials and nesting, has produced data (unpublished) on the relative importance of control—by the animal in the nest area—of smell, light, and noise levels, as well as of temperature. Or again, the use by females and young of a particular spot for urination, which can be more clearly observed in this design

than in previous ones, has led to experiments (unpublished) about the female (rather than male) use of urine in communication. Lastly, the simple shape of the parts of this design has led to the use of the cage in conjunction with certain other experimental accessories in which the behavioral aspects of the study are important; these were experiments in which other designs were not adaptable (Wallace, 1968, 1981b; Wallace and Hudson, 1969; Wallace, 1977).

### *A Lesson From the Work in Mouse Cage Design*

In today's climate of changing attitudes toward animal welfare and rights, as well as to the human right to the esthetic satisfaction of attending to these concerns, any cost-benefit analysis must include factors that evaluate these intangibles. The following figures (Fig. 2-5) and tables (Tables 1 and 2) indicate that these factors were appreciated in the design process of the Cambridge cage and indicate how this process may be applied to other species.

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**FIGURE 4.** The design features meeting human requirements. The assembled cage is indicated by an arrow. It shows the food trough, comprised of the shelter (on the left side) and upright bars of wire

frame (on the right side), and the divider (see also Fig. 2); the trough holds food for 1 to 2 weeks so that filling up the trough coincides with the change to a clean bowl. At the tip of the arrow is the lowest

point of the trough, 2.2 cm above the bowl floor—this amount of clearance prevents the mice from being crushed underneath. All of the parts required for the cage are cheap, light, stackable, and strong; materials are plastic, stainless steel, and aluminum. All of the parts are easily cleaned and assembled. The bar interval and fit of all the parts allow no escapes. The design is adaptable to accessories (see Table 3 and Fig. 5, item 7). The separate parts include: (1) Plastic bowl: made of polypropylene, but can be made in transparent polycarbonate for behavior studies; there are no ridges to be gnawed, and the lid protects the rim from gnawing. The cost of the bowl is minimal because it was made commercially for another purpose, which covered the cost of the mould. (2) Wire frame of lid: upturned rim smooth and simple for comfortable handling (Fig. 2). The card numbered 2 rests against the indented end, which accommodates the cage clip (8) when the lid is put on and taken off. (3) Bottle: capacity allows sufficient water to last a long weekend; sloping "shoulders" and wide neck facilitate cleaning. The bottle can be carried in its compartment spout upwards (the jerking of a handler while walking can cause spills). (4) Bottle cap: pliable plastic for close fit and rapid removal for filling. It is protected from being gnawed where it pro-

trudes through the wire frame (2), by a short, thick bar. (5) Capillary tube for cap: easily cut from purchased lengths, edges flamed smooth; the bore does not block with grit and it minimizes drips as the mice drink. Its thickness protects it from siphoning out on contact with bedding. The resulting dry bedding minimizes smell. (6) Shelter: simple shape; can be made of transparent material for some behavior studies (or the shelter can be gently raised at its upper edge so that the mice can be seen without disturbance). The draft-free nest area to which the shelter contributes enhances breeding output. (7) Divider: prevents food from interfering with the siting of the bottle; simple shape. (8) Card clip: holds cage card by insertion into a slit in the bowl rim (see Figs. 2 and 3); it can be quickly moved to a clean bowl. (9) Cage card: usable on both sides; numbered 1-12 along the bottom so that the clip (10) may indicate the number of young in a litter. (10) Plastic paperclip: in four colors; has both narrow and broad sides and can be placed in different positions, it gives eight items of information about the cage contents. This and the page information complement a simple and versatile experimental loose-leaf record system (Wallace, 1971; Luker and Luker, 1971).

### Long-Term Evaluation of a Design

It may be asked: Is there any evidence that the design process, as illustrated by the work on the mouse cage described above, is more than a "paper exercise"? A bonus arising from writing about this process 20 years after the cage came into use is that this question can be answered in terms of my own experience and impressions, as well as those of other users. A synopsis of the cage's advantages include:

1. The design exceeds standard requirements. The cage is more labor-saving than other designs, and produces more weaned young (see especially Wallace and Hudson, 1969). It is more productive even when inappropriately tested (Wallace, 1971a, especially p. 150).

2. The design stands up to human economies: Where the animal room has a few hours of relatively low heat (15°C), the nest area design, with the recom-

mended bedding, ensures maintenance of a warm nest. If external changes of air are reduced periodically (e.g., during electricity failure), the dryness of bedding slows the buildup of ammonia.

3. The design stands up to more of the animals' needs than those for which it was initially tested. It produces more weaned young per female than other designs, when the cage contains a breeding trio and two litters, a superovulating female, strains of mutants with known high mortality, and wild mice (Wallace, 1981). The cage also enhances the fertility and viability of "difficult" mutants (e.g., shakers, circlers, and otherwise retarded or handicapped mice, especially those sensitive to sound and cold), and it requires less frequent cleaning when holding mice with polyuria.

4. The design is adaptable for use with accessories. The bottle and trough areas may be altered without trouble for some behavior studies (Wallace, 1977;

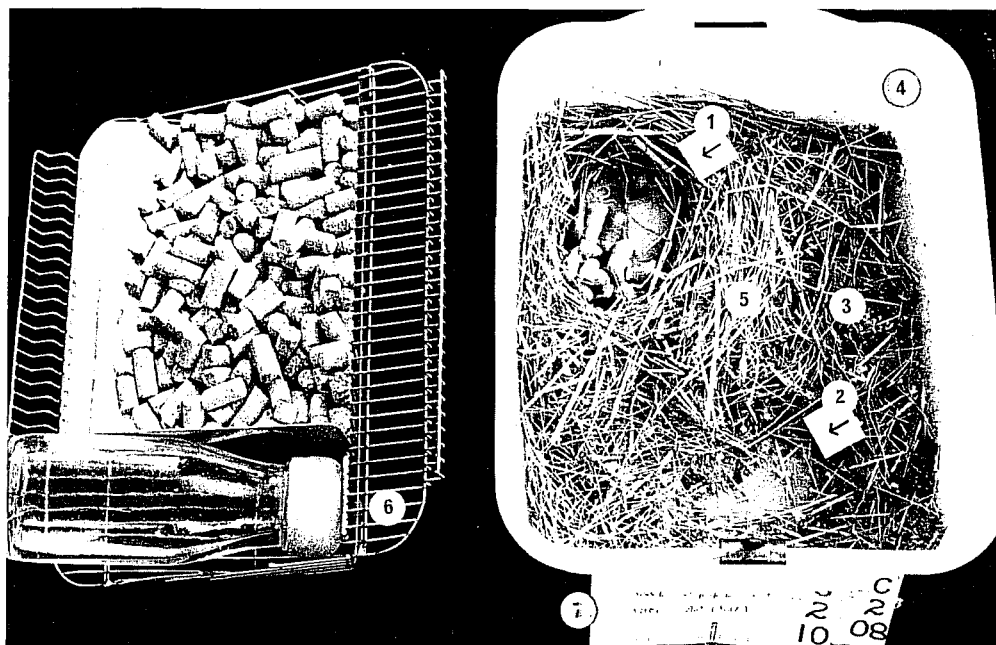
Wallace, 1981b). The localization of soiled bedding allows a vacuum cleaner to be used, with a hood placed over the mice in the nest, for minimal disturbance of difficult breeders (Wallace and Hudson, 1969). The long slope of the lid has no projections so that a simple retainer, in conjunction with a chute, allows speedy transference of wild or otherwise hyperactive mice to clean cages without handling them (Wallace, 1968). The versatile record system, with its page layout and special cage cards, has been adopted for

mouse keeping in schools as well as in laboratories (Wallace 1971b; Luker and Luker, 1971).

### Acknowledgments

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MARGARET E. WALLACE



**FIGURE 5.** Bonus features of a harmonious design. (1) Localization of the nest: allows mice to keep it clean, so that it may be moved intact to a clean cage, or protected by a hood for vacuum cleaning. These measures ensure minimal disturbance for the mice and retention of a familiar smell, which probably contribute to good lactation (removed roof of nest is indicated by an arrow). (2) Localization of nest exit: nest and food positioning results in this exit passing under the bottle, thereby keeping the spout clear of bedding (spout position is shown by an arrow). (3) Localization of excreta: this and the round corners of the bowl aid hand scraping or vacuum cleaning. Excreta under the low ven-

tilated (open) bars are kept dry and smell is minimal. (4) Retention of smell: the plastic bowl retains some "mousey" smell after washing, possibly reducing stress of females and fighting of males after transference to a clean cage. (5) Localization of bedding building: besides keeping the nest warm, this places a partial barrier between stored males, possibly reducing fighting. (6) Accessible spout: the low height of the spout is accessible even to circlers and retarded mutant weaklings. (7) Versatile labeling: two cards are shown here, one for each of two females in a trio—each card can accompany its female if they are separated for parturition (the labeling is part of a complete breeding record system).

**TABLE 1. List of Animal (Mouse) Needs**

BEHAVIOR	REQUIREMENTS
Activity	A living space permitting exploration, exercise, grooming and social interaction where territory can be marked; containing material providing sensory stimulation and adaptable for sleeping and nesting
Eating	Dry, ventilated, and cooler than animal's body temperature A balanced diet: hard enough to wear down growing teeth; and accessible enough to satisfy appetite and exercise paws, jaw, and the sense of smell
Drinking	Water (or moist enough food): with easy access, but ensuring a dry living space
Sleeping	A discrete area: for retention of body heat, and for social huddling (which may be a tactile need) Low light intensity "Mousey" smells (possibly desirable to the mouse?) and external noise should be controllable
Defecating	This seems to accompany activity and therefore can occur anywhere but the nest, so the nest area should be identifiable to the mouse Space restriction limits supply of food and water, so these must be inaccessible to excretory organs
Urinating	Activity areas should allow ventilation to dry out fecal pellets. An area away from the nest—restriction hinders territorial marking and escape of attacked males, so hiding places are desirable
Nesting	Use of urine for communication in mouse social groups, including females seems desirable An area where nest temperature can be controlled Bedding must be suitable for chewing and manipulating—the mouse uses bedding to form a "sweater" inside a "windcheater," i.e., the bedding insulates, but the confines of the bedding must be conducive to the exclusion of drafts around the time of parturition, and permit a gradual increase of air exchange during rearing of young (Note that "draft" and "air exchange" refer to air exchanges between activity area and nest area, not between the cage and the animal room)

**TABLE 2. List of Human Requirements**

CRITERION	REQUIREMENTS
	<i>In Relation to the Animal</i>
Confinement	Cage parts must fit such that there is no crack or hole big enough for the smallest active mouse to get through
Productivity	Maximum number of weaned young per female; this consists of maximum ova shed, minimum implantation and antenatal loss, minimum female mortality at parturition, and minimum mortality of young to weaning
Health	Cage conditions must complement the "macro-environment" to ensure certain disease-free levels
	<i>In Relation to the Cage</i>
Hygiene	Materials and parts must be easily washed and/or autoclaved The cage and its contents must be dry enough to discourage the growth of pathogens and fungus
Cost	The cage and its contents must not be smelly Materials and their manufacture must be cheap The design must be easy to mass-produce with a minimum of hand labor The parts must be durable in use—washing, storing, assembly and handling
Comfort for the Handler	No sharp or rough surfaces The parts and the whole must be light to carry The cage must be easily put on and removed from shelves The lid must be easily put on and taken off The contents must be easy to inspect, with or without the removal of the lid Ease of servicing, handling and storing
Design Should Be Adaptable	The parts must be easy to clean, stack and store, and easy to assemble and dismantle The design should be adaptable to accessories concerned with research (e.g., behavioral); with cleaning (e.g., vacuum cleaning); with handling (e.g., the chute); and with recording the status of the animals inside in terms of breeding and treatment

## References

- Barnett, S.A. (1975) *The Rat: A Study in Behavior*. University of Chicago Press, Chicago, IL.
- Jewell, P.A. (1964) An observation and breeding cage for small mammals, *Proc Zool Soc (London)* 143: 363-364.
- Lane-Petter, W. (1967) Animal-house equipment, In: *UFAW Handbook on the Care and Management of Laboratory Animals*, 3rd ed. E. & S. Livingstone Ltd., Edinburgh and London, U.K.
- Luker, A.J. and Luker, H.S. (1971) Genetics, In: *Laboratory Exercises in Zoology*. Butterworth, London, U.K.
- Tuffery, A.A. (1967) The mouse, In: *UFAW Handbook on the Care and Management of Laboratory Animals*, 3rd ed. E. & S. Livingstone Ltd., Edinburgh and London, U.K.
- Wallace, L.M. (1977) *A Psychological Study of Murine Agonistic Behaviour in Two Inbred Strains*. Sheffield University Psychology Library, Sheffield, U.K.
- Wallace, M.E. (1963a) Cage design principles, practice and cost, *J Anim Technic Assoc* 14:65-71.
- Wallace, M.E. (1963b) Laboratory animals: cage design principles, practice and cost, *Lab Pract* 12:354-359.
- Wallace, M.E. (1965) The Cambridge mouse cage, *J Anim Technic Assoc* 16:48-52.
- Wallace, M.E. (1968) A chute for the transference of hyperactive mice during cage-cleaning procedures, *Lab Anim Care* 18:200-205.
- Wallace, M.E. (1971a) A comment on experimental design, *J Inst Anim Technic* 22:149-154.
- Wallace, M.E. (1971b) *Learning Genetics with Mice*. Heinemann's Series: Investigations in Biology, London, U.K.
- Wallace, M.E. (1981) The breeding, inbreeding and management of wild mice, In: *Biology of the House Mouse*, R.J. Berry (ed.), Symposium of the Zoological Society, London 47:183-204.
- Wallace, M.E. and Hudson, C.A. (1969) Breeding and handling small wild rodents: A method study. *Lab Anim* 3:107-117.

## Ethical Issues and Future Directions in Wildlife Management

John W. Grandy

*Recent progress in protection of wildlife and wildlife refuges is currently being undermined by the efforts of James Watt, U.S. Secretary of the Interior, who believes that commercial interests should take precedence over the preservation of pristine wilderness areas and wildlife sanctuaries. The consequent loss, as populations approach extinction because of programs like decimation of habitats and predator control, is more than simply aesthetic: genetic material unique to each species will be*

*Dr. Grandy is Vice President, Wildlife and Environment, of The HSUS. This paper was presented at a symposium on Wildlife Management in the United States held by the Institute for the Study of Animal Problems on October 14, 1981, St. Louis, MO. At the time this paper was written, Dr. Grandy was Executive Vice President of Defenders of Wildlife, Washington, DC.*



lost forever. Particular issues of immediate concern are the fate of bobcats and whales, inhumane trapping, and the Endangered Species Act. As a longer-term concern, the goal of wildlife management should be the preservation of all species as members in viable, healthy ecosystems.

### Zusammenfassung

Gegenwärtig wird der Fortschritt im Schutz freilebender wilder Tiere und in der Erhaltung von Wildtier-Reservaten durch die Bemühungen von James Watt, Innenminister der USA, unterminiert. Er ist der Ansicht, dass kommerzielle Interessen Vorrang haben sollten über der Erhaltung von unberührter Wildnis und Wildtier-Reservaten. Der sich daraus ergebende Verlust, mit Tierpopulationen dem Aussterben ausgeliefert durch Programme wie die Verminderung des Lebensraumes und Raubtierkontrolle, greift tiefer als nur ästhetisch; genetisches Material, einzigartig wie es für jede Gattung ist, wird für immer verloren gehen. Besondere Probleme, die sofortige Beachtung finden müssten, betreffen das Schicksal der Wildkatzen und Wale, die inhumane Fallenstellerei und das Washingtoner Abkommen. In weiterer Sicht sollte Wildtier-Management der Erhaltung aller Gattungen als Bestandteil eines lebensfähigen, gesunden Oekosystems dienen.

### The Issues and Mr. Watt

Let me begin by saying that I am not going to cover *all* of the future directions in wildlife management in this paper, nor am I going to cover *all* of the ethical issues involved. Furthermore, the directions and ethical issues will not fall neatly into categories. This paper will therefore be a little like a basket containing a mixture of apples, grapefruit, grapes, and acorns. In short, some of the issues mentioned will be immediately relevant and will be of concern for the next 4 to 5 months; other issues will be of concern for the next 20 years and beyond. However, all will lead to some serious ethical concerns that society and wildlife managers must address.

No discussion of future directions in wildlife management could begin without discussion of Washington, DC's favorite four-letter word: Watt. In 9 months, James G. Watt, Secretary of the Interior, has become a threat to this nation's wildlife and public lands in a way that is unparalleled in the modern history of this country. Therefore, many of the specific future possibilities that I am about to discuss seem oriented toward

what will happen in the next few years if Mr. Watt's policies do not change tack and begin to reflect a more sensible approach to the preservation of this nation's wildlife and wild lands.

### Predator Control

First, let me start by explaining the issue. Predator control is a program sponsored by the U.S. government, which spends more than \$18 million in federal revenues on this effort every year. When cooperative funds and "in-kind" services provided by states, local governments, and private individuals are included, the total annual expenditures for the program probably exceed \$30 million. The predator control program is supposedly directed toward protecting the livestock industry from losses allegedly suffered due to predatory wildlife—such as coyotes and foxes—eating livestock. The program is strongly supported by both the sheep industry and the cattle industry, although one has to use a lot of imagination to envisage a 12-lb fox chasing a 600-lb steer across the open range.

The dimensions of the destruction

caused by this program are awesome: at least 750,000 coyotes have been killed in the last 10 years. And coyotes are the only animals that are really counted by the program's practitioners. To this admittedly minimum number of dead coyotes must be added tens of thousands of foxes, golden eagles, bears, badgers, skunks, raccoons, martens, and hawks and owls, most of which are killed by "accident." Even bobcats and bald eagles are killed, although some believe that the bobcat is a threatened species, while the bald eagle has long been in the endangered category.

The techniques that are used for this destruction are degrading to the animals and even to the people who ultimately conduct the killing: poisons, leg-hold traps, aerial shooting, denning (the process of killing coyote puppies in their dens), and neck snares. As used, these techniques are nonselective (for the animal that is actually doing the damage) and brutally inhumane.

Worst of all, perhaps, is that the program does not work. Even during the years of the most intense use of indiscriminate wildlife poisons such as Compound 1080, reported livestock losses rose by a factor of more than 2. (This figure is from data compiled by the U.S. Forest Service for sheep grazing on U.S. National Forests.)

All the while, predator control is justified as a "wildlife management program." But it is not a wildlife management program at all. It is a simplistic—and not very effective—political solution to the complex problems that do face the livestock industry.

For example, the livestock industry's major problems did not begin until about the time of World War II. Coincidentally and importantly, this was also the time when the industry began to lose its labor supply. People who had been sheepherders either went to war or (figuratively) went to Detroit to earn higher wages and make equipment for war. Af-

ter the war, the exodus continued, with people moving to make higher wages; by now, by making cars.

Let me use a hypothetical example to explain the importance of this exodus. A sheep rancher walks out of his house in the morning and sees a coyote eating a dead lamb in the pasture. In actuality, the lamb died the night before while it was being born. The lamb would not have died if a herder had been present to aid in the birth or if shed lambing had been utilized. The rancher, however, seeing the coyote eating the dead lamb, becomes irate. He picks up his rifle and shoots the coyote. The rancher then feels better, but he has not solved any of his problems. Only when the industry begins to focus on its real problems will real solutions be found.

This leads me back to my first point, about Mr. Watt. Mr. Watt now wants to once again allow the use of poison—1080—for predator control. He is openly advocating the return to utilization of 1080 and the resumption of other techniques for mass destruction of the public's wildlife, on the public's land. While this kind of political reaction to pressure from the livestock industry might be expected, it is no more acceptable than trying to justify the program by calling it "wildlife management."

I believe that we must get out of the business of destroying this nation's wildlife as part of any kind of program; rather, we must apply ourselves to implementing and/or finding acceptable ways of stopping livestock losses without killing wildlife. These ways, clearly, must involve, among other things the use of nonlethal predator controls and livestock husbandry techniques. This nation must never again allow itself or its personnel to conduct war on the public's wildlife.

### *Bobcats*

The issue with respect to bobcats

began, in the modern sense, in 1972. At that time, there was a massive international trade in the fur and skins of spotted cats, including cheetahs, ocelots, margays, jaguars, and tiger cats. The demand for these animals and others was pushing them toward extinction. The question was what to do about it. The answer was to construct an international treaty that protects animals and plants from the ravaging demands of international trade.

World leaders accomplished just that. A treaty, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, was drafted, negotiated, and then signed by about 90 nations in Washington, DC, in March 1973. (For simplicity, I will refer to the treaty as the "Endangered Species Treaty.") When the treaty was negotiated, all of the world's commercially important species of spotted cats were placed on a list in Appendix I of the Treaty, thereby giving the jaguar and leopard, as well as other cats, protection from commercial utilization in international trade.

In our jubilation about the treaty, we did not realize what would actually happen afterward. What happened was that pressure from the international fur trade shifted to what were essentially the only wild spotted cats left in the world that were then unprotected: the American bobcat and the Canadian lynx. The results of this shifting demand were devastating: the next few years saw a massive increase in the numbers of bobcat and lynx pelts in the international trade.

Largely as a result of this outcome, all of the unlisted cat species (*Felidae*) were added to the Appendices of the international treaty in 1976. In 1977, Defenders of Wildlife petitioned the U.S. government to protect the bobcat under our own U.S. Endangered Species Act.

(That petition, I should note, was accepted by the federal government in

1977, because we had presented, in the government's words, substantial evidence to show that the bobcat was indeed threatened or endangered. That finding notwithstanding, the U.S. government to this day has not acted upon our petition.)

But the bobcat had been added to Appendix II of the Endangered Species Treaty. So in 1979 Defenders of Wildlife brought suit in the U.S. District Court in Washington, DC, to halt the international trade in bobcats. We claimed in our lawsuit that the federal government had not complied with the provisions of the treaty which state that animals protected by the treaty cannot be exported unless the responsible governmental body in the U.S. makes a finding that such export "will not be detrimental to the survival of the species."

This is a very important concept because, as you will note, the language of the treaty puts the burden of proving that export will not be detrimental to the survival of the animal squarely on the government. In other words, *before* export is allowed, the government has to be certain that killing the animals for export will not result in harm to the species.

We have argued this for years. And then, in February of 1981, the Court of Appeals for the District of Columbia ruled that the government's action in allowing these exports had been illegal, and further ruled:

*Any doubt whether the killing of a particular number of bobcats will adversely affect the survival of the species must be resolved in favor of protecting the animals and not in favor of approving the export of their pelts.*

The ruling was, and remains, a fantastic victory for wildlife. The terms of the treaty have been upheld, and the Court has ordered the U.S. government

to comply fully with the protective provisions of the treaty.

That brings us back to the present, and to Mr. Watt. Now, the State Fish and Game Agencies, aided and supported by Mr. Watt, are demanding that the bobcat be removed from the protective provisions of the treaty and that uncontrolled trade in bobcats be allowed to resume.

Such actions would represent a travesty. This nation must maintain its international obligations; the government must meet its burden of proving that export will not be detrimental before allowing any international trade in our wildlife; and we must maintain our animals, as stated in the letter of the treaty, as viable components of the ecosystems in which they occur.

### *Marine Issues, Marine Sanctuaries, and Marine Mammals*

There are several issues in this area that appear to be of overriding importance. Seemingly, the major issue is the question: Will humans exterminate the largest mammals that have ever lived on earth—the great whales?

Another issue, perhaps a lot closer to home—perhaps not—is whether our U.S. National Marine Sanctuaries will be a viable home for marine wildlife or whether they will simply become another home for oil wells and oil pollution. Secretary of the Interior Watt, as it happens, has advocated opening marine sanctuaries to commercial oil drilling.

To me, the answers to these questions seem self-evident. We cannot allow marine sanctuaries to become anything less than totally protected sanctuaries for all marine wildlife. Moreover, the nations of the world cannot allow the extirpation of the great whales by explosive harpoons that are fired from whaling vessels that are literally rusting into oblivion.

### *Endangered Species Act*

The issue here is immediate, since the Endangered Species Act must be reauthorized by the U.S. Congress before October 1982. The major issue is: Will this nation maintain its commitment to the preservation of endangered and threatened forms of life?

Once again, the requisite answers seem reasonably clear. The nation ought to have enough respect for the sanctity of all life to demand that our activities not result in the extermination of life. But, if we as a nation cannot preserve life for *its* own sake, then we ought to at least demand the preservation of endangered and threatened life forms for *our* own sake.

I mean by this that the preservation of life on earth is inextricably tied to biological diversity, that is, the diversity of life and genetic information that is contained in all of the species that inhabit this planet. This diversity of genetic information is continually renewed and revitalized through breeding and evolution. Extinction, which results in the permanent loss of genetic material and evolutionary potential, thus threatens the health of a wide diversity of ecosystems and the survival of all life.

As individuals committed to the humane ethic and endangered species, it seems to me that our responses to these issues are clear: we must demand of our legislators that the Endangered Species Act be fully reauthorized and that this nation continue its commitment to the survival of endangered and threatened life.

### *Wildlife Refuges*

Although this section will be brief, the question of how we handle wildlife refuges in this nation is very important for the effects these procedures will have on future directions in, and the ongoing formation of philosophy on, wildlife

management. The National Wildlife Refuge System consists of some 400 wildlife refuges encompassing some 90 million acres, administered by the U.S. Fish and Wildlife Service. The main issue here is exactly what a refuge is.

It seems to me that refuges should not be areas where hundreds of thousands of wild animals are allowed to be killed by hunters and trappers, where trees are cut to be made into commercial lumber, where cattle are grazed, where pesticides are sprayed, or where dune buggies are allowed to run willy-nilly over the land that presumably provides habitat for wildlife.

Yet this is exactly what the Refuge System has become. More than 500,000 wild animals are shot each year in sport hunting programs, 146,000 are trapped, trees are cut, cattle grazed, pesticides sprayed, and recreational vehicles run amok. Indeed, a proposal that recently appeared in the *Federal Register* even suggested that those sand crabs that were not run over by beach buggies would easily be able to crawl over the ridges left by beach-buggy tires in the sand.

In my view, this situation is an abomination. The animals that come to the refuges for refuge are often shot, trapped, run over, or trampled, while their habitat is destroyed in the name of commerce.

This nation and its wildlife management community must demand a National Wildlife Refuge System that affords true refuge for the wildlife it is supposed to serve.

### Trapping

No discussion of the future direction of wildlife issues would be complete without a discussion of trapping. I hasten to add, however, that I am not going to go into great detail on this topic.

The major issue with trapping, it seems to me, is: Will we continue, as a society, to condone the use of one of the most barbaric and cruel devices ever devised—the leghold trap? By comparison, the guillotine, also a barbaric device, was an absolute pleasure.

Currently, the steel leghold trap accounts for the death and maiming of some 15 million wild animals each year, in this country alone. In my view, no truly civilized people can continue to condone this kind of torture and destruction of life.

I want to add at this point that I do not want to be misunderstood in this article, nor do I want my remarks to be misconstrued. There are now many areas of former controversy where conservation organizations, including Defenders of Wildlife, The Humane Society, wildlife management groups, and the State Fish and Game Agencies, now agree. Indeed, paraphrasing a reasonably current commercial, "We've come a long way, baby." We now have nongame wildlife programs, National Parks, some true wildlife refuges, and a public consciousness that has been raised substantially. But as my personal prognosis of future directions indicates, we still have a long way to go.

This leads me to two major issues of ethics and, importantly, to the question of our own survival.

The first issue is not difficult to understand: We must treat other life—wildlife—with the same dignity and respect that we would ask for ourselves. To do otherwise not only degrades wildlife but also degrades the human species. The concept is simple: children who see torture find it easy to perpetrate torture. If we want compassionate treatment for ourselves, we must start by setting the example of providing humane treatment to all life.

The second issue is a little more dif-

ficult, and to illustrate the issue, I want to close with a story.

On weekends around Washington, DC, I go to the shores of the Chesapeake Bay where I collect fossils of animals that were alive 12 to 20 million years ago. At home I have a fossil shark's tooth that measures a full 4 inches from top to bottom. The shark that contained this tooth was apparently about 60 ft long and was the predecessor of today's great white shark.

Even in my pocket I carry the bone of a fossilized animal. This also came from the shores of the Chesapeake Bay and is probably about 15 million years old. I carry this for the sobering effect that it has on my day-to-day actions. I will probably live no more than a hundred years. There was life on this planet 15 million years ago, and more of that life flourishes today. How fleeting are the impacts that *I* can have. Beyond that, these fossils provide me with a "15-million-year yardstick" with which to measure the actions of today.

The fossil record on the shores of the Chesapeake Bay shows abundant life existing 15 million years ago. Among the species which you find, aside from the shark's teeth, are scallops, whales, manatees, and sea turtles. How did these animals survive during those years? I don't think you have to be a biologist to answer the question. The animals survived because they were viable, healthy parts of functioning ecosystems. They thrived because they found the conditions that made life and reproduction possible for them.

But what of these animals today? Whales have been driven to extinction by the exploding harpoon and the greed of man; only just over 1,000 manatees survive in the United States (they die in large part because they are run over by boats); sea turtles have been destroyed throughout the world wherever they once found pristine nesting beaches; and water

pollution is destroying the East Coast scallops.

But let us shift our attention to another animal: the bobcat, which I mentioned earlier. The bobcat did not even show up in the fossil record until about 3 million years ago. That is, it evolved from other life forms 3 million years ago and has survived to this day, because it found the conditions upon which its life depends.

As I said earlier, we have been through about 2 years of court action designed to protect bobcats. During that time, we have been faced with every conceivable argument for why bobcats should be killed and their hides made into fur coats. We have been told by wildlife managers that bobcats need to be killed to stop diseases in bobcats and to halt bobcat overpopulation.

How do these arguments compare when measured against the 15-million-year yardstick of life? Without excessively elucidating the obvious, I will just say that the bobcat did not survive for the last 3 million years because wildlife managers were patrolling the woods limiting disease and population levels. Indeed, bobcats only survived because they were part of viable, healthy, functioning ecosystems. In these ecosystems, bobcats found what they needed to survive. In fact, disease probably did occur, but it only served to remove the unhealthy animals, thereby leaving the healthy ones more able to survive. And overpopulation, if it ever did occur, was taken care of by natural mortality within the ecosystems.

This leads to my last ethical issue, which touches upon the one overriding goal for wildlife management for the future. That is, the only goal for wildlife management should be to preserve viable, natural wildlife populations and the ecosystems on which they depend. Measured against a 15-million-year yardstick, no other goal makes any sense.

# Legislation & Regulation

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## **Australian Senate Inquiry into Animal Welfare**

For the first time, the Australian senate has begun a serious and comprehensive inquiry into the whole gamut of problems that fall under the general rubric of "animal welfare." Five general problem areas related to the well-being of animals have been identified and allotted to one of two Standing Committees, according to a scheme proposed by the Australian leader of the Democrats, Senator Don Chipp.

The Standing Committee on National Resources will investigate (1) interstate and overseas commerce in animals and (2) codes of practice of animal husbandry. The Standing Committee on Science and the Environment will look into (1) wildlife protection and harvesting, (2) animal experimentation, and (3) the use of animals in sport.

The specific issues to be examined by these committees do not appear to differ very much from those that have become the focus of proposed legislation in other countries. Yet, as expressed in the statement on "animal rights policy" adopted earlier by Mr. Chipp's party, the language and philosophical argument reflect much of the work of Peter Singer and other Australian animal liberationists:

*While man is, or should be, responsible for the welfare of all life on the planet, he is himself both part of that life and dependent on it for his survival. He shares with other higher animals both consciousness and sensitivity to pain. A difference in species does not, any more than a difference in race, justify a limitation to this respect for other animals, or his concern about the responsiveness to their suffering. Animals do not have a vote, but concerned people do. The Democrats must present*

*strongly and clearly an advanced and enlightened policy on animal welfare.*

Also, in speaking before the senate, Mr. Chipp stressed that it was vital that any new regulations relative to animal welfare be enforced uniformly throughout the nation. He asserted that current legislation is not only inadequate, but also differs considerably from one state to another. He also stated that, the Democratic policy statement notwithstanding, that work of the Select Committees must reflect a balanced perspective, and not simply represent an "ad hoc reaction to a particular situation." Animal liberationist requests, he said, must be weighed against "the practical considerations of animal husbandry."

Senator Evans of Victoria, in responding to Mr. Chipp's remarks, echoed the increasingly prevalent feeling that animal welfare is no longer merely the "pre-occupation of little old ladies in tennis shoes." Rather, "in talking about animal welfare, we are talking about something that is very much a legitimate pre-occupation for ordinary, concerned citizens. I think there is a growing appreciation that the basic issue involved in the campaigning of increasingly visible animal welfare lobby groups is a very basic issue of suffering which deserves attention and compassion by all civilized human beings."

The specific areas of concern to be covered by the two Standing Committees, as expressed in Mr. Chipp's statement to the Australian senate, are summarized below.

### *Overseas and Interstate Trade and Commerce in Animals*

Among other concerns, problems are created by the fact that, while each state does have its own regulations on

animal transport, there is no general stipulation on the maximum duration that animals may be held in transit. Nor are there any requirements to make "one person responsible for the animals at each point in the journey, and so responsibility for injury and death is abegated or denied." So an inquiry is urgently needed to determine how best to supervise journeys of stock animals, improve sale yard conditions, and learn more about the various types of transport currently in use for moving animals, "to prevent unnecessary injury and stress."

#### *Wildlife Protection and Harvesting*

At present, Australia has no endangered species act, yet it is known that about 30 species are currently threatened with extinction. Therefore, some sort of legislation to protect these animals is desperately needed. Concerning international trade in animals and pelts, Australia, as a signatory of CITES, will require funding for an inspection service to help halt the illegal traffic in wildlife.

Export of kangaroo products has been prohibited until recently, but now the new government is working to repeal this prohibition; in May 1981, for example, an agreement was reached with the U.S. government to permit the importation of kangaroo skins and products. But it is important to couple the trade in these products with careful population estimates, so that overzealous "harvesting" does not come to threaten these animals with extinction.

#### *Animal Experiments*

In this area as well, there is virtually no legislation pertaining to the protection of animals. There are some regulations on experimentation with animals in the various states, but these tend to be woefully inadequate: "anything can be done to a dog or a cat behind closed doors, without the researcher being answerable to anyone except his own peers." There is, though, a code of practice, which is promulgated by the National Health and Medical Research Council. This code states that procedures likely to cause pain must include use of an

anesthetic. But it is highly probable that the code is largely ignored in most laboratories.

The government should also encourage use and development of alternative techniques, as well as promote the idea that animal welfare representatives should be a regular part of all committees that oversee animal experiments.

#### *Codes of Practice on Animal Husbandry*

A draft code of practice on animal husbandry has already been prepared by the Sub-committee on Animal Welfare. However, this code fails to deal with an important element in factory farming—the ethological and behavioral needs of pigs—in particular, the kinds of diseases that are caused by the frustration of confinement.

#### *Animals in Sports*

Rodeoing, with its attendant high level of stress and painful injury to the animals involved, should be thoroughly investigated, as well as the use of whips in horseracing and more exotic events like wild-cow milking.

## Current Events

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### MEETING REPORTS

#### **Changes Needed in U.K. Animal Experiment Law**

The Association of Veterinary Teachers and Research Workers held a meeting at the Royal Society of Medicine, London, on February 26 to consider what factors and issues need to be considered to ensure that any new legislation on animal experiments conforms to the specific needs of the veterinary profession.

That new legislation was necessary, all agreed. But a careful consideration



of what exactly should be included, in particular, how "pain" should be defined, gave rise — as usual — to more questions than answers.

Dr. Jenny Remfry cautioned that the groups had to avoid anthropomorphism and sentimentality and, instead, concentrate on anatomical and physiological differences between humans and other animals. While perception of acute pain was similar in all animals, there was no evidence as to whether animals suffered emotionally on account of pain. She also noted that chronic pain, in particular, was perceived in the prefrontal cortex, which is highly developed in humans. Therefore, she asserted that it is reasonable to assume that humans probably have a more conscious awareness of chronic pain than other animals.

Dr. Remfry then listed several of the many kinds of questions that come quickly to mind when animal experiments are discussed, for example:

- Should animals bred solely for the purpose of experimentation be used preferentially?
- Should the purposes for which animals can be used be controlled?
- Should animals be killed at the end of an experiment?
- How can we best assess the comfort and well-being of the experimental animals? Should natural behavior such as burrowing be provided for?

Dr. Judith Hampson of the RSPCA discussed recent changes in public attitudes toward animal experimentation. She observed that the type of person actively concerned about this issue was now more likely to be young, with more extreme views than traditional "little old ladies in flowery hats." The general reluctance of scientists to provide much explanation for their positions on the use of animals was felt to be one reason for the recent rise in extremism.

Dr. Hampson also thought that the consensus of public opinion would probably support funding of the development of research into alternatives, as well as more control over what is done in laboratories. Like most of the other speakers,

she commented on the need for a new, workable definition of pain. She cautioned that any precise defining of "pain" must be subjective, but felt that some benchmarks for measuring suffering should nevertheless be established.

Dr. Bill Hiddlestone, from ICI, said that he thought industry would back legislation to restrict animal experimentation to registered sites and to set up a code of practice for the care of experimental animals. He advocated the general use of purpose-bred animals for research, but said that there should also be room for exceptions to this rule, for example, in the screening of wild animals as potential models.

Dr. Olga Uvarov of the Research Defence Fund stated that current legislation needed modification, to protect both animals and experimenters against extremists. She proposed simplification of the present licensing system and suggested that the license itself take the form of a passport-type booklet that would contain descriptions of experimental procedures and of facilities available. The present inspection system, she said, should be retained. She also felt that re-use of animals in a second experimental procedure should be permitted, if the first experiment was relatively simple and the animal appeared to be healthy after it. Concerning the breeding of animals, Dr. Uvarov thought that while rodents ought to be purpose-bred, the source of supply for other animals should depend on the purpose of the experiment. Assessment of pain, she believed, must depend purely on objective clinical signs, rather than subjective descriptions.

Mary Midgley, retired philosophy professor from the University of Newcastle, noted that views on the ethics of animal experiments had become more humanitarian recently, because the old Christian attitude toward animals, based on the idea that animals had no souls and could therefore be used as we wish, had largely been discarded. So a new clash of ideals, in which the acquisition of pure knowledge is being pitted against

the welfare of the animals used in obtaining it, has begun to emerge.

Finally, the Home Office Inspector, Dr. Derek Trevor, raised the issue of what method should be used in weighing the value of a proposed experiment, for instance, in terms of estimates of expected cash return from a proposed new procedure, or in advances in knowledge.

### **SCAW Conference Studies Responsible Use of Animals**

More than 100 scientists met at the National Institutes of Health at the invitation of the Scientists' Center for Animal Welfare to assess the effectiveness of current review procedures for animal experimentation and to make plans for a coordinated effort on behalf of responsible use of animals in research.

At a series of workshops, the four checkpoints in research review were dissected: the individual scientist, the institution, the funding agency, and the editorial review that precedes publication. Recommendations were then made for improving animal welfare, at each point in the process. But the consensus was that final responsibility for proper treatment of animals must remain with the individual investigator, regardless of what safeguards are currently in force.

Participants felt that, although the Animal Welfare Act and the NIH guidelines were helpful in maintaining high standards, better monitoring was needed. It was therefore recommended that NIH include an expert in animal care as a member of selected site visit teams and deny funding from programs that fail to comply with NIH guidelines for animal research.

The workshop on funding agency responsibility compiled a list of questions that a peer review committee should address:

1. Is the experiment worth doing?
2. Is the ethical cost to the animals commensurate with the scientific significance of the expected results?
3. Are the animals really required to test a proposed hypothesis and if so,

what are the suitable species and numbers?

The full proceedings of the conference will soon be available from Scientists' Center for Animal Welfare, 11325 Seven Locks Road, Suite 221, Potomac, MD 20854.

### **Man's Management of Domestic Species**

Eric Lamming, of the Nottingham University School of Agriculture, spoke at a meeting of the Central Veterinary Society on February 18 in Dorking, U.K. He examined the spectrum of problems that have resulted from the badly misguided notion that we can convert seasonally breeding animals to non-seasonal patterns of reproduction. As a prime example, he cited the thoroughbred horse. These animals breed naturally on the longest day of the year, but humans try to make them begin breeding in February. As a result, conception rates average about 67 percent, as compared with 95 percent for natural pony herds.

Similar problems occur in dairy cows. In tests for conception rates done by comparing progesterone profiles at 90 days after delivery, only 53.7 percent of the cows studied had significant levels of the hormone in their milk, whereas wild animals showed much higher percentages, and correspondingly higher conception rates. For example, red deer in Scotland had conception rates of close to 95 percent and a calving period of only 8 days.

Commonly used procedures for breeding of domestic animals also interfere with natural behavior, again resulting in fewer pregnancies. In natural conditions, the thoroughbred horse is a harem owner, and seldom interacts with females except at mating. This aspect of wild-type behavior is useful to the animals for sorting males from females. Also, endocrine signals play an important role in initiating mating. But under the conditions common to most farms, total segregation of males and females

inhibits these hormonal signals and, consequently, the animals' breeding. Dr. Lamming suggested that the more frequent use of field mating could help avoid this problem.

Other breeding difficulties in horses that arise from man's interference include the selection of older strains that have been shown to exhibit declining fertility. In particular, keeping mares from breeding until they are older in order to select for high growth rates means more ovulations without pregnancy, which in turn causes increased levels of zonal antibody and higher infertility rates. In cattle, an additional factor in low fertility is the tendency to breed repeatedly from females that are already of low fertility.

Professor Lamming noted that one problem in the manipulation of fertility was that the study of applied endocrinology is still in its infancy, and that many new investigations need to be done, for instance, on the factors that cause irregular or nonexistent cycles of ovulation in cows (in one study, more than 38 percent of all cows had abnormal ovarian cycles).

Both horses and pigs suffered badly, in terms of fertility, Professor Lamming concluded, if the sexes were segregated from one another. This practice, he asserted, was an easily avoidable instance of humans' mismanagement of their domesticated animals.

### **Non-animal Alternatives — Tissue Culture Methods**

The National Capital Area Branch of the Tissue Culture Association devoted its 1982 Spring meeting to the topic of "in vitro alternatives to the use of animals in research and testing." As is common in such meetings, some speakers addressed the concept of alternatives more thoroughly than others—the two most interesting talks were given by Dr. Joseph Leighton (Medical College of Pennsylvania) and Dr. Phillip Noguchi (Food and Drug Administration).

Dr. Leighton discussed the use of the chick chorioallantoic membrane (CAM) as a possible system for irritancy testing as well as in cancer research. Some of the advantages of CAM include the facts that

- It has no demonstrable nerve fibers for pain sensation
- Eggs from healthy flocks are almost entirely germ-free, and therefore the effects of extraneous agents can be greatly reduced
- The costs involved are very low—fertile eggs currently sell at three for \$1.

CAM has been used for many years to study viruses and bacteria, but its potential for evaluating the biological effects of chemicals has not yet been explored. Leighton noted that the new Zwilling technique for opening up a window in the egg shell avoids the problem of mechanical irritation of the CAM caused by shell fragments. This procedure should make it easier to introduce the CAM system into routine testing procedures.

His preliminary results with strong acid (hydrochloric acid) and alkali (sodium hydroxide) indicate that there is a quantitatively significant decrease in the size and severity of the lesion as one reduces the concentration of the agent. (This is true of tests on the 14-day embryonic CAM, but results from the 9- to 10-day CAM were very variable and did not show any significant trends.) Unfortunately, he had not yet examined any milder irritants, although he did suggest a variety of parameters, such as ectodermal thickening, which could possibly be employed to quantify the response. Finally, he argued that, if he could develop a satisfactory test system, the cost advantages of fertilized eggs (\$0.33 each) versus rabbits (\$25 each) should be a major inducement to industry to switch to the new test system.

Dr. Noguchi described results from his chick embryonic skin (CES) system for determining the tumorigenicity of cells. The classic test for this property involves injecting a nude or immunoincompetent mouse with a defined num-

ber of the test cells. If a tumor forms, then the cells are tumorigenic. However, the animal test has many disadvantages (e.g., false-negative results, variable sensitivity, and the necessity of long-term care for the test animals). The CES test involves inoculation of the suspect cells onto a piece of CES, followed by histologic examination 3 days later. Dr. Noguchi presented results indicating that the CES system was quick, sensitive, and predictive of tumorigenicity. In fact, it appeared to be more sensitive than the nude mouse system and also holds promise for allowing us to predict the metastatic potential of a tumor. So far, however, relatively few groups have switched to this system, although it was first described in *Science* (199:980-983) 4 years ago.

### **More on Animal Experiments — British Association**

On January 26, a symposium held in London by the British Association for the Advancement of Science also discussed the emotive and complex issues associated with animal experimentation. Many of the usual controversies, especially about how best to concoct an enforceable legal definition for "pain" arose, but several new aspects of the problem also came to light.

Brian Gunn, of the National Anti-vivisection Society, voiced concern about administration of the pain clause, because there was no way to measure pain, and the terms "severe" and "enduring" were being interpreted differently by each license holder.

Dr. W. Parrish of Unilever spoke for industry; he stressed the moral and legal obligations of producers to protect consumers from potential adverse reactions to new products. He also defended the utility of the LD50 test—he asserted that it was an essential element in quantifying possible toxicity. He stated that the Draize test seldom caused more than mild irritation in the eyes of the test

rabbits and that, at the present time, no non-animal method tested had proved adequate for industry's needs. He acknowledged that there were variances in response between humans and animals, but insisted that experience had demonstrated which tests could provide good correlation between effects in different species. He did admit that, slowly, more *in vitro* methods were being introduced as replacements for animal testing.

Dr. Judith Hampson spoke on the moral aspects of experimenting on animals. She detailed several particular instances of dubious experiments, in which pain appears to have been ignored. For example, in one study monkeys had been poisoned with paraquat to examine renal failure. However, this condition only appears in about 24 humans a year, so the suffering of the animals hardly seemed justified.

Professor C.T. Drollery countered Dr. Hampson's contentions. He stated that he himself had seen about 12 cases of fatal paraquat poisoning. He also asserted that toxicity testing in animals was vital, although he thought that an LD10 or LD15 might provide adequate data. Test animals, he said, had in his experience received excellent care and suffered less than humans.

Tom Dalyell, MP for West Lotham and Opposition spokesperson for science, observed that, in Parliament, "you are either for or against animals." He doubted that any new legislation on animal experimentation would be introduced before the next general election. The public's feelings about the welfare of dogs and cats, he noted, were far different from their emotions about rats. Proposed new safety regulations, according to Dalyell, could mean the lives of 25 million experimental animals.

Mr. Gunn concluded the session with the observation that, in the 105 years since the Cruelty to Animals Act had been in force, no one had ever been convicted of an offense. He speculated that this dearth might be due to the fact that Home Office inspectors are, in the main, former vivisectionists themselves.

## FORTHCOMING MEETINGS

**National Zoological Park:** 6th Reptile Symposium on Captive Propagation and Husbandry, July 28-31, Washington, DC. Contact Bela Demetar, Department of Herpetology, National Zoological Park, Washington, DC 20008.

**The University of Georgia:** Conference on Business and the Environment, August 4-8, 1982, Athens, GA. Presentations will include: "From Biology to Business: Principles Are Modified, in Practice, by Facts"; "Land Reclamation: Regulatory Compliance and Corporate Responsibility"; and "Ethical Effects of the Adversary System in Environmental Affairs." Contact Business and the Environment, Georgia Center for Continuing Education, the University of Georgia, Athens, GA 30602.

**Gordon Research Conferences:** Symposium on Toxicology and Safety Evaluations, August 6-8, 1982, Kimball Union Academy, Meriden, NH. Papers presented will include "In Vitro Methods of Characterizing Various Pathways in Carcinogenesis"; "The Changing Roles of Pathology in Toxicology and Safety Evaluations"; and "Behavioral Assessments." Contact Dr. Alexander M. Cruickshank, Director, Gordon Research Conferences, Pastore Chemical Laboratory, University of Rhode Island, Kingston, RI 02881.

**International Primatological Society:** IXth Congress, August 8-13, 1982, Atlanta, GA. The annual meeting of the American Society of Primatologists will be held jointly with the Congress. Contact Dr. Frederick A. King, Director, Yerkes Regional Primate Research Center, Emory University, Atlanta, GA 30322.

**American Association for Laboratory Animal Science:** 33rd Annual Session, October 3-8, 1982, Washington, DC. Contact Joseph J. Garvey, American Association for Laboratory Animal Science, 210 North Hammes, Suite 205, Joliet, IL 60435.

**The American Forestry Association:** 2nd Annual National Urban Forestry Conference, October 10-14, Cincinnati Convention Center and Stouffer's Towers Hotel, Cincinnati, OH. Of interest to those concerned about the interaction between animals and the environment will be sessions on urban forestry; recreation and wildlife: the multiple uses of community forestry; environmental education in interpretation; and integrated pest control. Contact Henry De Bruin, American Forestry Association, 1319 18th Street, NW, Washington, DC 20036.

**American Society for Testing and Materials:** Symposium on Pesticide Formulation and Application Systems, October 12-14, 1982, Drawbridge Motor Inn, Fort Mitchell, KY. Contact Don Viall, (202) 299-5546.

**Shipping World & Shipbuilder and Aniservices International:** "Anitrans '82," October 21-22, 1982, London. Various aspects of animal transport will be covered, including the extent of the trade, financial implications, international laws and regulations, transport of animals to and from the ship, experiences of an animal carrier, insurance, the World Wildlife Federation's point of view, the animals' welfare, case studies, ship design and operation, animal condition monitoring, and loading/unloading and port practice. Contact G.B. Taylor, 6 Rosedale Close, North Hykeham, Lincoln, U.K.

**Alternatives in Toxicology:** An international meeting which will include extensive discussion of the above topic will be held at the Royal Society in London, November 1-3, 1982. It is suggested that those who are interested contact FRAME, 56 The Poultry, Bank Place, St. Peter's Gate, Nottingham, NG1 2JR, U.K.

**International Council for Laboratory Animal Science:** "The Contribution of Laboratory Animals to the Welfare of Man and Animals: Past, Present, and Future," July 31-August 5, 1983, Vancouver, BC,

Canada. (Please note that the conference will be held in 1983, not 1982, as was erroneously printed in the last issue of the *Journal*.) Topics covered will include: a geographic overview of laboratory animal science; the animal model in gerontological studies; the development, status, and future of international quality in laboratory animals (standardization); and new and future trends in biotechnology. Contact Mr. D. Jol, ICLAS/CALAS 1983, Box 286, 810 West Broadway, Vancouver, BC, Canada V5Z 1J8.

**Australian Society for the Study of Animal Behavior and the Australian Academy of Sciences:** 18th International Ethological Conference, August 29-September 6, 1983, Brisbane, Australia. Potential participants are being given early notification for this conference, since this is the first time an International Ethological Conference has been open to all behavioral scientists, and therefore no channels of communication have been established to reach all those who might be interested in attending. The content of the plenary sessions has not yet been determined, and the committee sponsoring the conference would welcome any suggestions on possible session topics. Plenary sessions will be strongly didactic, but will also provide a general overview of recent developments and highlight any problems or controversies. Contact Conference Secretary, Animal Behavior Unit, University of Queensland, St. Lucia, Australia 4067.

## ANNOUNCEMENTS

### Animal Rights Bibliography

Professor Charles R. Magel, Director of the Society for Animal Rights, has compiled a comprehensive bibliography to the English-language books and articles on the subject of animal rights. The volume, which includes several thousand entries, is entitled *A Bibliography on Animal Rights and Related Matters* and is published by the University Press of America, Washington, DC. The price is \$28.50.

## Archive on Animal Liberation

In a related effort, the Animal Liberation Collective of Canada has begun to assemble a wide-ranging collection of materials that will comprise the core of a clearinghouse for information on animal rights issues. The staff of the collective has been gathering materials for about 4 years, and is now starting to organize and categorize it. Types of materials available include:

- Government papers and statistics
- News clippings
- Organization literature
- Material representing opposing viewpoints.

At a later date, slides will also be added to the collection. The Collective is also searching for any new contributions to its collection that people feel are of significance — these contributions should be originals or clear copies, with source and date noted on the item.

The data is organized into the following categories:

- Animals as human food and vegetarianism
- Laboratory animals and replacement techniques
- Trapping and commercial hunting, sport hunting and fishing
- Animals in entertainment (zoos, rodeos, circuses, dog racing, horse racing, animal fights, etc.)
- The pet industry
- Animals and ecology (topics such as pest animals and endangered species).

The Collective asks that all requests for information be as specific as possible. For further information, contact Animal Liberation Collective, C.P. 148, Durham Sud, Quebec, Canada JOH 2CO.

### New Publication on Non-animal Testing Procedures

Volume 1, Number 1, of *In Touch... Alternative Methods in Toxicology* came off the presses in May of this year. It will be published quarterly, in a four-page

newsletter format. An editorial note on the first page comments that the purpose of the publication is to enhance communication within the scientific community on the single topic of alternative methods for toxicological testing, and to act as a "catalyst to effect progress and innovative change in this field."

This first issue features an overview of new non-animal methods for assessing toxic effects — including an analysis of the inherent limitations of the Draize test — an update on legislation related to alternatives, and a brief article on the importance of incorporating courses on non-animal methods in the curricula of future research scientists.

Information about the newsletter can be obtained from Princeton Scientific Publishers, Inc., P.O. Box 3159, Princeton, NJ 08540.

### **Veterinarians for Animal Rights Launches Publication**

The Association of Veterinarians for Animal Rights, whose formation was announced in the last issue of the *Journal*, has published its first issue of *Animal Rights — News and Views*, a compilation of reprinted letters and articles on animal problems that will be of particular interest to the veterinarian. Included are letters on ear cropping, an article on legal regulation of dogs in the Soviet Union, and a list of courses on ethics and animals. To find out more, write to Neil Wolff, D.V.M., Association of Veterinarians for Animal Rights, 69-40 229th Street, Bayside, NY 11364.

### **Millenium Guild Offers Half a Million for New Non-animal Test Methods**

Pegeen Fitzgerald, president of the Millenium Guild, announced on April 13 that her organization will offer two \$250,000 incentive awards for innovative non-animal testing techniques. One of the awards will be given for a workable alternative to the Draize or LD50 tests. The other prize will be offered to

promote the development of techniques that will facilitate measurable reductions in the numbers of animals used in toxicity testing.

The funding for these awards has come from a multitude of concerned individuals (rather than large corporations) who, in the words of Ms. Fitzgerald, "insist on crash programs," and hope that the impetus of large cash rewards will provide sufficient incentive to motivate more researchers to discover and utilize testing methods that do not involve pain in animals.

### **Farm Animal Humane Society Is Announced**

The Farm Animal Care Trust (FACT) has recently been formed in Chicago, and represents the first humane society to focus its attention solely on animal production practices. The group will be directed by Robert A. Brown, who was formerly the head of the Anti-Cruelty Society of Chicago.

Mr. Brown has said that the group will be especially concerned with intensive confinement systems. One of its first activities will be the publication of *Fact Sheet*, which will be distributed free to humane societies across the U.S. Another program will be devoted to field research, which will encompass investigations of both North American and European developments. This information will be used, Brown stated, to press for changes in current production methods.

### **British Veterinarians Oppose Intensive Farming**

A meeting of veterinary surgeons was held at Reading University to discuss concerns about the trend toward the increasingly intensive conditions in animal husbandry, largely a result of current government policies, combined with economic and consumer pressures.

The group felt that there was a real need for a forum where the issue of intensive farming could be discussed without sentimentality, on the one hand, or

pressure from agribusiness, on the other. The meeting also noted that it was unfortunate that the government had rejected the recommendations of the Parliamentary Select Committee on Animal Welfare, intended to curb the worst abuses of intensive farming.

Therefore, to provide an opportunity for open dialogue, and to press the government to reconsider accepting the Select Committee's recommendations, it was decided that an Association of Veterinarians Concerned About Animal Husbandry should be formed. The group is inviting all interested colleagues to join them in their efforts. For more information, contact Association of Veterinarians Concerned About Animal Husbandry, 8 Hamilton Close, South Mimms, Potters Bar, Herts EN6 3QD, U.K.

### **Human-Animal Relationships to Be Explored at University of Minnesota Center**

CENSHARE, a joint venture of the College of Veterinary Medicine and the School of Public Health of the University of Minnesota, has been serving since 1981 as a focus for multidisciplinary research, education, and service concerning human-animal relationships and their environments.

A recent project concerned the practical ramifications of a law passed in 1979 by the Minnesota state legislature that allows nursing homes and other health care facilities to keep pets on the premises, subject to reasonable rules as to the care, type, and maintenance of the animals. However, as so often happens with legislation intended to establish standards for use of animals, the language of the statute gave rise to considerable confusion and ambiguity.

CENSHARE therefore conducted a survey of nursing homes and similar establishments to find out more about how pets were being utilized in these facilities. Of the 762 respondents, nearly 50 percent reported that they were currently using animals. In nursing homes, it

was found that animals tended to be only transient visitors, brought in by residents or humane societies, whereas in supervised living facilities, more resident animal programs are common.

The center offered a university course during the Spring of 1982 entitled "Perspectives: Interrelationships of People and Animals in Society Today," which explored issues such as problems engendered by the keeping of pets in urban environments, as well as more general concerns such as the meaning and relevance of the "animal rights" concept. For more information about the center's activities, contact the Center to Study Human-Animal Relationships and Environments, 1-117 Health Sciences Unit, 515 Delaware Street, S.E., University of Minnesota, Minneapolis, MN 55455.

## **Book News**

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**Self-Awareness in Domesticated Animals**, D.G.M. Wood-Gush, M. Dawkins, R. Ewbank, eds. (The Universities Federation for Animal Welfare, Hertfordshire, England, 1981). This volume, the proceedings of a workshop on animal awareness, held at Keble College, Oxford, in July of 1980 contains a selection of valuable papers and discussion that deal with such topics as pain sensation and pain reactions in animals, bodily awareness, awareness and self-awareness, emotions and display of emotions, and the problem of distinguishing awareness from responsiveness. This last topic was the subject of the opening presentation by D.R. Griffin, who emphasized that further studies



of animal communication might serve as a "window" to animals' thoughts, and also cautioned that the possibility of self-awareness in social insects should not be ruled out simply because their behavior is often genetically determined and relatively stereotypic. However, the correlation between social complexity and self-consciousness may be more tenuous than the correlation between neural (especially cortical) complexity and consciousness.

Griffin concludes, "If we allow a considerable awareness of animal's environment and its companions, but deny it any self-awareness whatsoever, we are forced to postulate that the abundant information that impinges on its brain from its own body is barred in some special way from reaching its awareness. Such a limitation seems both implausible and maladaptive, for information about itself is at least as important to an animal as information about anything else, if not more so."

The philosopher S.L.R. Clark observed that far too many students of animal behavior equate *predictable* behavior with lack of *feeling* and that behavior is only possible for a creature with some inward dimensions, with its own real perception of the world (*umwelt*): "Within that framework we do not see merely material motions but, rather, the embodiment of character and feeling in a material mode." Likewise, Clark was critical of the typical ethologist's mechanistic view of interpreting virtually all behavior as *stereotyped response* rather than as possibly *intentional* or anticipatory action, and raised the provocative question of whether ethologists, as a group, have a sufficiently strong self-concept of their work, since they rarely take account of the long-term consequences of what they do to animals that can sense, feel, respond, and suffer. He was also critical of Cartesian philosophy, which accepts the concept of self and mind in humans, yet rejects the possibility of mind and a sense of self in animals, since the existence of such cannot be proved or even empirically tested. He suggested that the concept of panpsy-

chism should be seriously entertained, arguing that, since it is present now, it must also have been extant from the beginning.

Unfortunately, neither Clark nor any of the other contributors to the symposium explored the differences between intelligence and consciousness or self-awareness and sapience and sentience. Also, a potentially more fruitful debate might have been generated from discussions of play behavior and creativity in animals, as well as what we know about fear and anxiety (conditioned emotional reactions) in animals. A discussion of this latter topic would have particularly enriched and extended D. Bowshe's paper on pain sensations and reactions. His paper concluded that animals' perception of *chronic* pain may be analogous to that in humans with pre-frontal cortical lesions, i.e., that "it may or may not be consciously perceived, but suffering in connection with it is extremely unlikely." However, on the basis of neurological evidence, Bowshe is convinced that animals certainly feel *acute* pain and react to it in the same way as humans.

Wood-Gush defined self-awareness as the animal's ability to abstract and form a conceptual framework of its environment so that it can perceive itself and its actions in relation to that environment. The paper by G. Woodruff clearly demonstrated such self-awareness, in his studies with David Premack on chimpanzees. In a series of ingenious tests, they demonstrated that these primates are capable of making causal inferences ("knife cuts apple") and of elaborating abstract mathematical concepts such as number and proportion, that they take into account the condition & demeanor of the recipient in formulating communicative behavior, and that they can be shown to have intentionality, as when they choose to communicate accurate or false (i.e., deceptive) information. Other tests demonstrated that chimpanzees can observe another's behavior and analyze and interpret it discriminately, an ability that supports Humphrey's concept of a "natural psychology" in social

animals.

N.K. Humphrey proposed that the capacity for having emotions has evolved hand-in-hand with the capacity to express them. This sort of contingency correlation postulates that feelings represent an evolutionary adaptation to social life. Humphrey also suggests that any animal that lives in a complex social group needs to be a "natural psychologist," with the ability to anticipate, stimulate, and model the behavior and feelings of other group members. In sum, social animals must have a sense of "I-ness," of both self and other.

Yet sociability and behavioral complexity need not be prerequisites for self-awareness. D.M. Vowles suggested that even "body awareness forms a rudimentary mechanism for self-consciousness, consciousness of the outside world, and perhaps purposes and intentions must clearly affect the way we interpret animal behavior."

Altruistic behavior may be an indicator of an animal's ability to sense what another is feeling. Such fellow-feeling, which may reflect empathy and compassion, has been observed in social animals such as elephants, dolphins, wolves, and chimpanzees. The greater the degree of self-awareness, the greater may be the degree of other-awareness, which in man (as in animals socialized to humans or other species), may be extended to other species, as trans-species altruism.

R. Mugford presented case-histories of dogs with behavior "problems" (such as sympathy lameness) who had learned to predict their owner's intentions and actually manipulated their owners. Mugford concluded that this was evidence of self-awareness; he argued "if one can anticipate certain of one's needs (say, for food, shelter, companionship, etc.) and manipulate matters so that the needs are fulfilled, then one is self-aware."

However, G. Thinés, in discussion, contended that experiments to demonstrate self-awareness in animals are impossible, because the question is philosophical rather than empirical. But the general consensus of the workshop par-

ticipants was that the question of self-awareness provides a legitimate challenge to the standard methodology and pre-suppositions of conventional biology and that there are many questions that might be fruitfully investigated. For example, To what extent are animals that are self-aware also aware of what is going on in another's mind? To what degree can animals anticipate future events, in relation to delayed gratification, thus indicating self-awareness, if not enlightened self-interest? Do animals (such as farm animals raised in confinement) suffer when they are deprived of things they have never experienced? Certainly the existence of self-awareness in animals raises many questions pertaining to their welfare. For example, the ability of animals to experience chronic pain, anxiety, or frustration (for example, as a result of preventing them from performing some innate behavior), compel us to consider the moral and ethical dimensions of the scientific question of animal awareness.

Perhaps the best conclusion to this review is a quotation from Clark's paper:

*In brief, there is reason to think, within the framework of educated assessment and empathy, that animals who live in social groups, with relatively long lives and a need to resist temptation in an environment where purely stereotyped behaviour will be maladaptive, will have some degree of self-awareness. Awareness itself does not have any clear evolutionary rationale, but self-awareness does. It does not "pay" such aware creatures as do not need to live long and varied lives if they are to leave genetic replicas to have any self-awareness. It does "pay" aware creatures that need to regulate their actions in accordance with relatively long-term goals and under the eyes of their fellows. Accordingly, some non-human animals are self-aware.*

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