"Surplus Population" and the Hunter

When an anti-hunter confronts a hunter with questions about how he (or she) is able to kill innocent animals, the hunter will often counter by affirming that the deer he kills are simply surplus population that would otherwise face a cruel death from winter starvation. The debate usually ends at this point, since the two protagonists are speaking about two different issues. The anti-hunter is talking in terms of moral issues, while the hunter believes he is talking science. A recent report argues that the term "surplus population" is a misnomer, and is based on a lack of understanding about the dynamics of ecosystems and the natural factors that control animal populations. D.S. Favre and G. Olsen contend that the current situation is as follows. (The full report is available from Society for Animal Rights, Clarks Summit, PA.)

Wildlife populations can be increased dramatically by many kinds of factors, such as availability of food and the length of a species' yearly gestation period. In the end, though, it is the carrying capacity of a given area that sets the actual limit to animal numbers, despite short-term increases and decreases in numbers that result from other causes. 

Hunting, however, represents an anomaly, since it is one of the few factors that can destroy the natural balance whose long-term effects on, for example, the gene pool of the species and the populations of other species who share the habitat have not yet been studied scientifically. At present, many State government agencies are committed to a program whose chief goal is maximizing deer populations. These efforts are self-funded, and therefore independent of regulation from other State agencies. So any change in the current mentality toward hunting will require a concerted educational effort on the part of those who oppose hunting. This effort must be directed toward untangling the moral and ecological consequences of hunting and understanding the slippery basis of the pseudoscience that rationalizes it.

Animal Rights and Poultry: A Framework for Discussion

An excellent paper on animal rights and its implications has recently been published by a poultry scientist. The author discusses the topic in relation to man's evolutionary history as a predator and exploiter of other species. It is suggested that, providing man attempts to eliminate suffering from the animals with which he is dealing, there is no reason why he should not exploit them. However, decisions on the degree to which, and the manner in which, we exploit animals are ethical decisions that should be made by society in general, but only when it has a knowledge of the facts.

Some definitions of animal welfare are given, and the need for objectivity in debates on welfare is emphasized. Although it may be possible in the future to gain some insight into the subjective feelings of domestic fowl, including whether or not they are suffering mentally, at the present time the scientist is restricted to producing factual evidence on their health, production, physiology, biochemistry, and behavior.

Three methods for assessing the welfare of poultry using behavior are described and discussed. One method is to look for unusual or inappropriate behavioral changes and show independently that they are indicative of reduced welfare. A second method is to allow the bird to choose its own environment and assume that it will choose in the best interests of its welfare. A third method is to subject birds experimentally to stressful situations such as deprivation, frustration, or fright, observe their behavior, and compare it to that which occurs under commercial conditions. To date this method has been the most successful in helping to assess the welfare of poultry. (Abstracted from J.H. Duncan, Poult Sci 60:489-499, 1981.)

The French Stand Firm on Right to Hunt

In recent issues, the Journal has reported research which identifies how historical and local cultural factors can become dominant influences in a particular country's attitudes toward wildlife, in spite of a common western cultural heritage. A prime example is that of Italy, where hunting is becoming increasingly popular, in part because of national values related to machismo and social conformity (Int J Stud Anim Prob 2(3):114, 1981). Now it seems that similar kinds of cultural values, based on a sense of pride about hard-won rights for the lower classes, are at work to support the survival of the fox hunt in France.

By contrast, in Britain the days of the fox hunt seem to be numbered. Rising costs, the increasing success of anti-blood sport groups, and a change in public opinion are commonly cited as reasons for the decline. For example, a poll indicated that 66 percent of the public opposed the idea of fox hunting by members of the royal family.

But in France, fox hunting is considered one of the basic rights that was wrested from the aristocracy at the siege of the Bastille in 1789. Any attack on fox hunting is therefore viewed by the Left and Communists as an assault on the lower classes. There are 1,700,000 licensed hunters in France, as compared with 300,000 in Britain.

Recent times have seen some decline in the numbers of French hunters, largely stemming from the same pressures noted in England, such as rising costs and effective anti-hunting campaigns by ecologists. Ecologists assert that over-hunting is threatening many species with extinction. But the basic principle of the right to hunt is still being staunchly defended. As Communist leader George Marchais remarked: "The right to hunt is a conquest of the French Revolution. It must be defended."
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Good Marks for Calves

In Britain, calves that are too weak or sickly to be of interest to those who rear calves or the more reputable dealers end up being passed from one market to another, until they are finally sold for raising or slaughter. Often, they die during transit. And these are the weakest animals, least able to withstand the repeated stress of loading and unloading involved in the constant movement from one sale lot to another. The calves are legally permitted to be as young as 7 days old; often, they are even younger, since there is no reliable way of telling how old a calf actually is. A further complication is that there is no quality control among these weakened animals, especially antibiotic-resistant salmonellosis. At a symposium on the topic, John Bell commented that "a visitor from another planet might deduce that the salmonellosae had devised this system in order to ensure their own survival and prosperity" (quoted in Vet Rec 109:523, 1981).

Along with many other groups, the British Veterinary Association is pressing for regulation of this kind of transit: a Movement of Calves Order, which would make it an offense for a calf of less than 2 months to be brought to sale at more than one market within a period of 4 weeks.

The difficulty comes in figuring out how to ensure that an individual calf has not been recently presented for sale. To solve this problem, the BVA has suggested that each calf be marked when it first comes to market. Current BVA thinking holds that the best place for such a mark might be on the calf’s thorax, where the hair could be clipped or dyed. Then, when a marked calf appeared at a sale,
staff could check the owner’s records, to ensure that it had not been at market with- in the last 28 days.

Captive Bolt Shooting

Captive bolt stunning performed frontally, occipitally, and on the nape of the neck was studied in 30 veal calves. The state of consciousness was estimated by results on electroencephalograms recorded via surgically pre-implanted electrodes placed frontally, on the right side of the head. Frontal stunning on the left side of the head, as well as occipital stunning, almost certainly ensured immediate unconsciousness, because delta and theta waves (tending to an isoelectric line) appeared on the EEG directly after stunning. Additionally, the corneal reflex was absent. However, occipital placing did not result in macrosomical damage to the cortex due to lack of funds. Various animal welfare groups lobbied on his behalf with the Canadian government and, as a result, he will now receive $10,000 per annum for the course via the Canadian Council on Animal Care. In addition, Dr. Gilles Julien, Executive Director of the Natural Sciences and Engineering Research Council (NSERC) of Canada has stated that grant selection committees have been explicitly encouraged by NSERC to promote alternative methods to animal research when conducting site visits.

Tissue Culture Course Funded

For a number of years in the 1970’s, Dr. Sergey Fedoroff at the University of Saskatchewan ran a tissue culture course for anyone interested in learning the techniques for working with cells in culture. However, he was forced to stop offering the course due to lack of funds. Various animal welfare groups lobbied on his behalf with the Canadian government and, as a result, he will now receive $10,000 per annum for the course via the Canadian Council on Animal Care. In addition, Dr. Gilles Julien, Executive Director of the Natural Sciences and Engineering Research Council (NSERC) of Canada has stated that grant selection committees have been explicitly encouraged by NSERC to promote alternative methods to animal research when conducting site visits.

Follow-up: Pulmonary Hemorrhage in Racehorses

In the last issue of the Journal (31: 17, 1981), it was mentioned that R.W. Cook, Professor of Equine Medicine and Surgery at the University of Illinois, has estimated that only 0.8 to 2.5 percent of all racehorses actually experience hemorrhage (epitaxis) after a race, although approximately 25 to 80 percent of all horses are given the drug Lasix, a purported cure for bleeding, before a race.

However, more recent work by J.R. Pascoe et al. (Am Vet Res 42: 703, 1981), who examined horses within 2 hours after racing with a flexible fiberoptic endoscope, showed dramatically higher percentages of true “bleeders.” Of the 235 thoroughbreds examined, 103 (43.8 percent) showed varying degrees of hemorrhage in the tracheal lumen, although only 2 horses (0.8 percent) had subsequent blood flow from the nostrils. Statistical analysis of the data, however, did support previous findings that the frequency of hemorrhage tends to increase with the age of the horse. This trend is considered to reflect the long-term effect of chronic pulmonary lesions: an inability to repair damaged areas of tissue in the face of continued stress of training and racing. Also, treatment of bleeding with Lasix still appears to be of little value: 30 of 56 Lasix-treated horses had evidence of pulmonary hemorrhage.

Sheep Become Latest Victims of Intensive Farming Conditions

A proposed solution to some of the problems of sheep-raising has recently been introduced in Australia: sheep are being kept, for the duration of their lives, in large, windowless sheds. The sheds are on average 60 by 300 feet; they are ventilated by louvers and a roof opening along the edge. Each pen in the shed measures roughly 12 by 15 feet, and usually contains about 20 sheep. This translates to one sheep for every 9 square feet. To keep the sheep’s fleece clean, floors are constructed of wooden slats, so that urine and feces can fall through. Feed, in the form of soybean, grain, and vitamin pellets, is limited to 600 grams a day; feeding is kept to 3 days a week. The sheep would normally eat twice this amount, and more often, but it has been found that no extra wool yield would accrue from the increase in feeding.

Other practices include the taking of skin samples (about 5 mm in diameter) without the use of anesthetic. The only apparent advantage to the sheep from this intensive method of husbandry is the virtual absence of blowfly strike. In the absence of the blowfly problem, the need for the painful mulesing operation is obviated (see Int J Anim Prog 11(4): 224-226, 1980 for a complete discussion of the complexities of this problem).

Wild and Exotic Pets: Better Off in the Wild

As more and more people are attempting to keep wild and exotic animals as pets, bites and other injuries from these animals are becoming increasingly common. In particular, the number of reported rabies cases is on the rise, with pet skunks and raccoons the most common sources of infection. About 3,000 cases of confirmed rabies in skunks were reported in 1979, compared with 3,600 in 1980. Furthermore, recent research has shown that the rabies virus can be transmitted vertically in skunks and bats (i.e., to offspring), even when the animals have been raised on ranches for many generations. Also, since there is no licensed rabies vaccine for use in wild or exotic animals, and the precise incubation period required for the clinical signs of rabies to appear is unknown, nondomestic animal bites to humans usually mean that the animal involved must be destroyed.

In addition to rabies, wild animals have been implicated in other kinds of severe attacks. Typical cases include:

- In Michigan, a 4-month-old girl was severely mauled by a pet raccoon; the child died on the next day.
- In Texas, a 5-year-old boy survived a pet raccoon attack which occurred while he slept. The animal tore off the end of his nose, tore his lips, and scratched him.
- In Colorado, a 5-week-old girl was attacked by a ferret; nearly half of each ear was chewed off, and there were multiple puncture wounds on her face.
- In California, a 27-year-old man was bitten and killed by a pet Indian cobra snake, part of a collection of 89
Jewish Ritual Slaughter May Ignore Animals' Welfare

The question of ritual slaughter has aroused much debate over the past months. A recent meeting of the Veterinary Public Health Association (U.K.) discussed Jewish ritual slaughter (Shechita) and why it is practiced. The authors report some of the points made at that meeting and review arguments that have been advanced in support of shechita, and also explain the British Veterinary Association view on this method of slaughter. In the opinion of the BVA, shechita, which involves killing the animals by a single slash, with a 40-cm blade, to the carotid artery leaves vertebral arteries intact, resulting in an active, although reduced, blood supply to the brain. The animals therefore suffer reflex convulsions about 5 to 10 seconds after the ritual cutting, although it is hard to discern whether any pain is perceived by the animals. Nevertheless, the BVA feels that a minimal stressful slaughter procedure should entail some concern about handling of the animals before killing and pre-stunning procedures that are not a part of traditional shechita. (Editorial, Vet Rec, September 26, 1981.)

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Among other considerations, the behavior of wild animals is often a prob-
lem. Wild animals respond in ways that are unpredictable to owners who are not
prepared, through adequate education, to handle them properly; only rarely
does a wild animal become a fully domes-
ticated pet. Such an animal will re-
tain its natural reactions and therefore
perceive many kinds of movements as
attacks or aggressive threats.

Proper nutrition of these kinds of
animals presents another problem, since
most prepared diets, intended for com-
mon domesticated animals, are simply
not adequate. Reptiles and amphibians
in particular have highly specialized
dietary requirements, which are not
often easily available.

Perhaps the best solution to the prob-
lem of wild and exotic animals kept as
pets is a total ban. Organizations such as
the Center for Disease Control and the
American Veterinary Medical Associa-
tion strongly recommend that those
States that have not already prohibited
the keeping of these animals immedi-
ately enact legislation of their own. The AVMA
also recommends that the U.S. Public
Health Service, USDA, and Department
of Interior cooperate to draft laws that
would halt the interstate shipment of
wild animals for pets.

But, given the determination of
some people to own and display exotic
animals, any attempt at a total ban will
probably end in failure. An alternative
solution is a State permit system, pat-
tered on that already in place for fal-
con owners, under which those who
want to keep falcons must meet certain
federally established requirements that
include a written exam on basic biology,
care, handling, and laws pertinent to
raptors; building of proper facilities for
the bird; and banding and registration
with the U.S. Fish and Wildlife Service.

For raptors, at least, this program
seems to work. Because of the stringen-
cy of these requirements, few cases of
injuries to humans from domesticated
raptors have been reported. (Abstracted
from S.L. Diesch, Cal Vet 35(12):13-17,
1981.)

The Draize Campaign — A Summary

In 1979, Henry Spira, an English
teacher in New York and an animal activ-

ist, started to lay the groundwork for a

campaign against the Draize Eye Irritancy
test on rabbits. (See Cosmetics Technol-
ology 3(7):32-37, 1981 for background
on the test.) Spira spoke to representa-
tives from animal welfare groups and

industry. At the end of 1979, he

put together a coalition of over 400
human societies to campaign for the
abolition of the test with a specific focus
on the cosmetic industry.

The first step in the campaign con-

sisted of an approach to a major cosmetic
company (Revlon) to ask for their assis-
tance. They requested a formal proposal
and the coalition accordingly drafted
one requesting the following action:

1. Revlon should approach the Cos-
metic, Toiletry and Fragrance Associa-
tion (CTFA) with a proposal that the CTFA
coordinate a collaborative effort by indus-
try to seek an alternative to the Draize;

2. Revlon should commit $170,000
(0.01 percent of their gross income)
to the project.

Revlon responded on February 13,
1980 and stated that the proposal had
been turned over to the relevant CTFA
committee and that “neither Revlon, nor
any other single company, can give any
assurances as to what action, if any, this
committee, or any other committee of
the CTFA, may take on this matter, ex-
cept to say that it will receive considera-
tion.” Needless to say, this response did
not find much favor, and the next phase
of the coalition’s campaign got under way.

This phase consisted of an exhorta-
tion to all groups to mobilize their forces
to write and protest to (a) the major cos-
metic companies; (b) the relevant U.S. reg-
ulatory bodies — (The Consumer Product
Safety Commission (CPSC), the Environ-
mental Protection Agency (EPA), the
Food and Drug Administration (FDA) and
the Interagency Research Liaison Group;
(c) their representatives in Congress; and
(d) the media. The Millenium Guild in New
York City chose Revlon as its sole target
and took out a full-page advertisement
(“How many rabbits does Revlon blind
for beauty’s sake?”) in the New York
Times on April 15.

The advertisement itself became
news and focused the campaign spotlight
on Revlon in particular. It also galvanized
other companies into action: the CTFA
were soon organizing a closed workshop
to discuss the prospects of developing
an alternative to the Draize. However,
the joint initiatives did not help Revlon.

Donald Davis, editor of Drug and Cos-
metic Industry, noted in the June (1980)
issue of the magazine that the attack on
Revlon “probably has engendered more
sympathy in the industry over the com-
pany’s ‘plight’ than any other single hap-
pening since the founding of the company....but...there has been a distinct
lack of ‘volunteers’ among industry lead-
ers to help take the heat off Revlon.”

At the end of the year, Revlon grew
tired of being the target and announced
that it was making a 3-year grant of
$750,000 to Rockefeller University to re-
search possible alternatives. Revlon also
invited other cosmetic companies to
join it in supporting such research. Now
that the dust has more or less settled,
one can point to the following results of
the campaign. These indicate that earlier
protestations that “all that can be done
to ameliorate the test and seek alterna-
tives is being done” were very mislead-
ing. Many constructive actions were pos-
sible.

Industry Actions

The first major result of the coali-
tion’s campaign was the organization by
the CTFA of a workshop on the Draize
test. This was an important event be-
cause it stimulated a reassessment of at-
titudes (at least two participants com-
mented that they had begun to reevaluate
their approach) and because it identified
research avenues that could have poten-
tial. Anthony Johnson of Unilever (U.K.)
was one of the main innovative forces:
he presented promising data on the use
of in vitro eye preparations as irritant
screens, on the use of smaller volumes
of the test sample, and on the use of local
anesthetics.

Following up on Revlon’s grant of
$750,000 to support research into the
Draize test alternatives, the CTFA an-
nounced the formation of an Ad Hoc
Fund for Alternatives to Animal Testing,
with a goal set at 1 million dollars. Avon
immediately pledged $750,000, followed
by Estee Lauder with $350,000. Other
companies, including Bristol-Myers,
Chanel, Mary Kay and Max Factor, have
also contributed to the fund. The CTFA
has now awarded 1 million dollars to
Johns Hopkins University to establish a
Center for Alternatives to Animal Testing.
The center will be directed by Dr. Alan
Goldberg, a toxicologist and cell biolog-
ist in The Johns Hopkins School of Hy-
genie and Public Health. The Center will
focus on basic research with the aim of
identifying test methods that will dimin-
ish and replace the use of animals. Some
of the research will be based at Johns
Hopkins, but it has also been proposed
that promising projects at other institu-
tions be funded. A symposium on the
topic of alternatives in ophthalmic and
dermal testing is set for the middle of
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But, given the determination of some people to own and display exotic animals, any attempt at a total ban will probably end in failure. An alternative solution is a State permit system, pat-
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nounced the formation of an Ad Hoc Fund for Alternatives to Animal Testing, with a goal set at 1 million dollars. Avon immediately pledged $750,000, followed by Estee Lauder with $350,000. Other companies, including Bristol-Myers, Chanel, Mary Kay and Max Factor, have also contributed to the fund. The CTFA has now awarded 1 million dollars to Johns Hopkins University to establish a Center for Alternatives to Animal Testing. The Center will be directed by Dr. Alan Goldberg, a toxicologist and cell biolog-

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Research Initiatives

As a direct result of the Draize campaign, a number of research proposals and ideas have been put forward, and some data have been made available that might otherwise have never been published. For example, the research experience of the Unilever laboratories in the U.K. was communicated at the CTFA workshop. Also, Johnson and Johnson’s experience with the use of serotonin as an index of response to an irritant was announced at the recent NIH symposium on trends in biosassay methodology (McCormick, 1981).

The first funded project specifically identified as a search for a Draize alternative was the Revlon grant of $750,000 to Dr. Dennis Stark of Rockefeller University. However, it has taken some time for the research to get underway. According to Dr. Stark, his group will be looking at the release of chemotactic factors in vitro in response to an irritant, in an effort to identify specific factors that could be used as reliable indicators of irritant potential.

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The third project was also funded by the humane movement, in this case by a consortium of groups led by the American Fund for Alternatives to Animal Research. They gave $176,000 to Professor Joseph Leighton (Medical College of Pennsylvania) for a 3-year study of the potential of the chick chorioallantoic membrane (CAM) for assessing inflammatory response. The CAM is well supplied with blood vessels, and it has been known since 1911 that irritating materials placed on the CAM will evoke a distinct inflammatory response. On the other hand, there are no pain-detecting nerve fibers in the CAM, according to Professor Leighton.

General Outlook

The success of the Draize test campaign has definitely had an effect on attitudes toward animal testing. There is more willingness on the part of officials in regulatory agencies to listen to arguments based on humane issues and more scientists are addressing the issue. For example, Professor Frederick Sperling (Howard University) has stated that he holds “no brief for this [Draize] test, which is not a good one scientifically .... It is deplorable that better testing for pain response but did not significantly affect irritancy scores. The guide notes that anesthetics should not be used in most instances. “However, if the test substance is likely to cause extreme pain, local anesthetics may be used prior to installation of the test substance for humane reasons.”

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Friendliness and Pigs

Hemsworth et al. (1980) have shown that the reproductive performance of sows is enhanced when the animals are treated with “tender loving care,” as reflected in the lower rate of fear toward strangers (observers).

Stockmen who spend little time with the animals, so that they are not well socialized to people, will have sows that are easily disturbed and even fearful of human proximity which, as these researchers have shown, adversely affects productivity (16.5 live piglets per sow per year, versus 21 on farms where there was a good sow-farmer relationship).

In a second study with two groups of pigs, stockmen either deliberately socialized growing pigs by stroking and talking to them or repulsed them and handled them roughly. “Good” and “bad” treatments were given for 2 minutes three times per week for the first 8 months of age. The “loved” pigs grew 5 percent faster than the “unloved” ones. (Abstracted from Livestock Prod Sci 8:67-74.)

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In most large slaughter plants, bleeding begins within 30 seconds after electric stunning, but there are still some plants with intervals of 60 seconds or more. Reducing the stunning-to-bleed interval will help improve meat quality, especially in items such as canned hams.

Problems with animals regaining sensibility during bleeding can be nearly eliminated by using an electric stunner that stops the heart. Meat inspection regulations in the United States and some other countries should be changed to permit the use of stunners that cause cardiac arrest. This type of stunner is usually applied to the head and the fore legs or to the head and the back (Gilbert, 1980; Grandin, 1981); the current must pass through the brain.

Cardiac arrest does not adversely affect bleedout or meat quality. In pigs, "Cardiac arrest did not affect the weight of the blood lost, the rate at which it was lost, or the amount apparently retained in the carcass" (Warris and Wotton, 1981). In sheep bled while prone, bleedout was slower and less blood was collected during the first 2 minutes; however, there were no significant differences in the pH value of the meat, tenderness, hemoglobin concentration, myoglobin concentration, or growth rates of spoilage bacteria from sheep stunned with a conventional electric stunner as compared with sheep that had been stunned with a stunner that stopped the heart (Kirton et al., 1981; Chrystall et al., 1981). Observed differences in bleedout between the two groups could probably have been minimized if the sheep had been bled while standing. Lambooy (1981) also reports that cardiac arrest in electrically stunned calves did not affect the hematinc value in the meat as compared with controls with beating hearts.

In Holland most of the pigs are stunned with electric stunners that cause cardiac arrest. The same method is also used on sheep in New Zealand. I have observed electric stunning in both Holland and New Zealand, and I was impressed with the humaneness and efficiency of their methods. Another advantage of an electric stunner that stops the heart is that the animal does not kick the shackle and sticker, and blood splash in the meat is reduced (Kirton et al., 1981). Research by Blackmore (1981b) indicates that young calves sometimes remain sensile for more than 60 seconds after their throats are cut for bleeding. For electrical stunning to be humane for calves, stopping the heart is essential. In my opinion, the only humane methods for stunning calves are use of a captive bolt or an electric stunner that stops the heart.

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References

Coyote Control Action Attempted by Interior and EPA

Three States—Wyoming, South Dakota, and Montana—in addition to the U.S. Department of the Interior have recently submitted applications to the Environmental Protection Agency to resume use of the poison Compound 1080 (sodium monofluoroacetate), previously banned in 1972, to kill canid predators, principally coyotes. The Interior Department is also recommending that the practice of denning be reintroduced. "Denning" involves the killing of entire litters of coyote cubs in their dens. This procedure was stopped in 1973, under the order of Interior Secretary Cecil Andrus. The currently available alternatives recognized by Interior are trapping, aerial and ground shooting, snaring, use of dogs, and the M-44, a spring-loaded device that propels sodium cyanide into a coyote's mouth. Interior would also like EPA to relax 10 of the 26 existing restrictions on the use of the M-44. These changes are requested on behalf of privately held lands.

Meanwhile, in a January 29, 1982 press release, the Fish and Wildlife Service announced the cancellation of a 1972 Executive Order that restricted the use of chemical toxics on Federal lands and in Federal programs to control livestock losses. Use of poisons like 1080, on these lands, however, is still subject to EPA control; what's been lost is the back-up regulatory mechanism that has been provided by the 1972 Executive Order.

The Rationale Behind the 1972 Decision

Compound 1080 was banned in 1972 by the EPA Administrator because of a formidable body of evidence about the complex array of toxic effects that the agent could create throughout an environment. The accumulated data had demonstrated that 1080 was highly toxic to all species, including humans: at least 13 people (and possibly as many as 18) died from 1080 poisoning. Many nontarget animals were killed, including endangered species like the California condor.

In summary, the EPA statement asserted that there were "no reliable data on the amount of predator control achieved by use of these poisons," and that there were effective alternatives to the use of 1080 and other predacides.

A 1979 statement by Interior Secretary Andrus reaffirmed theses conclusions and set objectives for the department's Animal Damage Control Program that included a long-term phase-out of lethal control measures, a corresponding switch to nonlethal, noncapture methods of control, and an emphasis on "preventing predator damage rather than controlling predators."

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While the Interior Department can resume hunting without further challenge, reintroduction of 1080 requires an adjudicatory hearing before an EPA Administrative Law Judge because EPA is specifically responsible for ascertaining that all types of pesticides marketed in the United States do not cause unreasonable adverse effects to humans or the environment. (Chemicals intended for control of predators are considered pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act.)

At the initiative of the EPA, therefore, the Agency held informal preliminary hearings in Denver and Washington in July 1981. On the basis of the findings from those hearings, EPA decided to convene formal hearings in early 1982. In a press release issued on December 1, 1981, Administrator Gorsuch asserted that "substantial new information" had been gleaned at the Denver-Washington meetings and noted two particular points (quoted in full):

1. The finding in the 1972 cancella­tion that 1080 posed significant hazard to humans may have been in error. Compound 1080 has been widely used in the United States since 1972 to control rod­ents without any reported human mortality.

2. Further, pharmacological research suggests 1080 may metabolize rapidly to a less harmful substance, casting doubt on the conclusion in the 1972 order that the chemical is a primary and secondary poisoning hazard to nontarget species.

She also stated that spokesmen at the July hearings had stressed the differ­ences between the old pre-1972 delivery mechanism for 1080 — the large-bait station (usually a poisoned carcass of a sheep or lamb)— and two more recently developed mechanisms, the toxic collar and the single lethal dose (SLD) bait. The 1080 collar is a rubber and plastic appar­atus that is wrapped around the neck of a sheep or goat. It contains two 1080-filled compartments, which break and release the poison when a predator attempts to bite the throat of its prey. The SLD baits, made of fat or meat containing sufficient 1080 to kill a coyote, are placed around a "draw station" such as a dead sheep or calf at sites frequented by the target species.

In 1977, EPA began issuing experi­mental use permits to the Department of the Interior to allow use of the 1080 collar in limited field testing; these permits have been renewed every year. EPA bases its reissuance of these permits on a report by Terrill (cited in the EPA re­port, Notice of Hearings on Application to Use Sodium Monofluoroacetate (Com­pound 1080) to Control Predators, 1981) on trends in predation losses: Losses of lambs were 35 percent higher for the years 1972-1978 as compared with 1956-1972. Cattle losses (from all sources) increased during 1972-1980 by 11.2 percent over losses for 1950-1972. Ranchers also claimed that alternative methods such as aerial gunning of predators are both costly and ineffective. Wildlife conservationists strongly disagree with these numbers and claims, EPA has nonetheless decided to proceed.

Finally, EPA has made use of new research by Kun (Notice of Hearings on Application to Use Sodium Monofluoro­acetate (Compound 1080) to Control Predators, 1981) which the Agency has utilized to formulate a completely new pat­tern for the cellular metabolism of 1080 than has been previously assumed. It is claimed that 1080 itself is nonpoisonous: it must first be converted to fluoroca­tricate by cell enzyme systems to exert its effect. It is also asserted that there is little risk of secondary poisoning from the carcass of a 1080-killed animal, because a scavenger that consumes fluorocitrate from a primary victim would detoxify the fluorocitrate residues before they had a chance to exert any toxic effect. Any secondary poisoning effect, there­fore, must come from unmetabolized fluorocitrate remaining in the primary victim. But it is also claimed that ingested 1080 breaks down rapidly (in 5-10 hours) into nontoxic metabolites under any circumstance.

However, in a recent letter to Ad­ministrator Gorsuch (February 8, 1982), Joseph Cowan, Assistant Chancellor of the University of California, San Francis­co, speaks of Kun's consternation on find­ing that the EPA had distorted, and in some cases contradicted, his actual data. For example, on the issue of the break­down of 1080, Kun had actually stated that "the trace amount of fluorocitrate formed from 1080 is biochemically un­stable." The letter asserts that "There is a vast amount of difference between a research finding of 'nontoxicity,' as claimed by your [Press] Release, and one of 'instability.'"

The Mechanics of the Formal Hearing Procedure

As announced in the December 7, 1981 Register, all parties interested in the use of 1080 were given until Janu­ary 26, 1982 to file a Statement of Position on all the issues involved and also file a preliminary list of witnesses with a "brief narrative summary of their expected testimony." Actual testimony before the Administrative Law Judge began in March and is expected to last about 60 days. At the conclusion of the hearing, the judge will make a recom­mendation to Administrator Gorsuch on whether to resume use of 1080. The judge's recommendation is not, however, binding on the Administrator.

Animal Welfare Groups Against 1080

A coalition of animal rights advocate groups that includes The Humane Society of the U.S. (HSUS), Defenders of Wildlife, the National Audubon Society, and the Sierra Club, among others, is be­ing represented at the hearing by a Washington-based law firm. These groups believe that the logic behind the deci­sion to hold a formal hearing procedure is invalid since the vast compendium of evidence that led to the 1972 and 1979 decisions on 1080 and denning is still un­shakably sound, that none of the new data obtained since then has changed the essential facts about the broad-spe­ctrum toxicity of 1080 to the environ­ment. They point to the thousands of pages of testimony compiled by the Fish and Wildlife Service in public hearings held in 1978 and 1979, prior to the 1979 statement by Secretary Andrus. The coalition now believes that "any major significant departure from these deci­sions must not only be consistent with the existing record or plainly supported by a new record com­plied with similar attention to the Na­tional Environmental Policy Act" and other appropriate legislation such as the Endangered Species Act (1973), the Wild­erness Act (1976), and the Administra­tive Procedures Act (1976) (letter to Secre­tary Watt, November 19, 1981).

In contradistinction to the findings of Kun cited above, the coalition points to several well-established facts about the primary pharmacology of 1080 and its subsequent distribution in the environ­ment, as set forth in a 1972 EPA decision paper on the banning of 1080. Chemically, sodium monofluoroacetate can be described as a white powder that is soluble in water and also highly stab­ile. It is therefore very persistent in ground water and is transported into an ecosystem. Further, 1080 is readily taken up by the root and leaf systems of plants. The possible effects of this on grazing animals, both domes­tic and wild, are still unknown.

Monofluoroacetate is highly toxic for all species: a dose as low as 0.5 to 2 mg/kg of body weight acts rapidly on the central nervous system and heart, caus­ing arrhythmias and convulsions. Since these effects come on too quickly to per­mit any effective treatment, antidotes are relatively valueless. Death, however, may not arrive until many hours after the initial poisoning. However, as noted by Natasha Atkins (wildlife biologist, then working for The HSUS), in her state­ment before the informal EPA hearings in July 1981:

The lethal dose for a canid is between 1-2 mg, while it would take 100-200 mg to kill a human... Canids are so susceptible to 1080 poisoning, foxes, wolves, and domestic dogs are potential victims. Some of these, notably the San Joaquin Kit Fox, the Northern Kit Fox, and some sub-spe­cies of the Gray Wolf are endanger­
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1. The finding in the 1972 cancella- tion that 1080 posed significant hazard to humans may have been in error. Compound 1080 has been widely used in the United States since 1972 to control rodents without any reported human fatality.

2. Further, pharmacological research suggests 1080 may metabolize rapidly to a less harmful substance, casting doubt on the conclusion in the 1972 order that the chemical is a primary and secondary poisoning hazard to nontarget species.

She also stated that speakers at the July hearings had stressed the differences between the old pre-1972 delivery mechanism for 1080—the large-bait station (usually a poisoned carcass of a sheep or lamb)—and two more recently developed mechanisms, the toxic collar and the single lethal dose (SLD) bait. The 1080 collar is a rubber and plastic apparatus that is wrapped onto the neck of a sheep or goat. It contains two 1080-filled compartments, which break and release the poison when a predator attempts to bite the throat of its prey. The SLD baits, made of fat or meat containing sufficient 1080 to kill a coyote, are placed around a "draw station" such as a dead sheep or calf at sites frequented by the target species.

In 1977, EPA began issuing experimental use permits to the Department of the Interior to allow use of the 1080 collar in limited field testing; these permits have been renewed every year. EPA bases its reissuance of these permits on a report by Terrill (cited in the EPA report, Notice of Hearings on Application to Use Sodium Monofluoroacetate (Compound 1080) to Control Predators, 1981) on trends in predation losses: Losses of lambs were 35 percent higher for the years 1972-1978 as compared with 1958-1972. Cattle losses (from all sources) increased during 1972-1980 by 11.2 percent over losses for 1950-1972. Ranchers also claimed that alternative methods such as aerial gunning of predators are both costly and ineffective. While conservationists strongly disagree with these numbers and claims, EPA has nonetheless decided to proceed.

Finally, EPA has made use of new research by Kun (Notice of Hearings on Application to Use Sodium Monofluoroacetate (Compound 1080) to Control Predators, 1981) which the Agency has utilized to formulate a completely new pattern for the cellular metabolism of 1080 than has been previously assumed. It is claimed that 1080 itself is nontoxic: it must first be converted to fluorocitrate by cell enzyme systems to exert its effect. It is also asserted that there is little risk of secondary poisoning from the carcass of a 1080-killed animal, because a scavenger that consumes fluorocitrate from a primary victim would detoxify the fluorocitrate residues before they had a chance to exert any toxic effect. Any secondary poisoning effect, therefore, must come from unmetabolized fluorocitrate remaining in the primary victim. But it is also claimed that ingestion of 1080 breaks down rapidly (in 5-10 hours) into nontoxic metabolites under any circumstances.

However, in a recent letter to Administrator Gorsuch (February 8, 1982), Joseph Cowan, Assistant Chancellor of the University of California, San Francisco, speaks of Kun's constellation on finding that 1080 had distorted, and in some cases contradicted, his actual data. For example, on the issue of the breakdown of 1080, Kun had actually stated that "the trace amount of fluorocitrate formed from 1080 is biochemically unstable." The letter asserts that "there is a vast amount of difference between a research finding of 'nontoxicity,' as claimed by your [Press] Release, and one of 'instability.'

The Mechanics of the Formal Hearing Procedure

As announced in the December 7, 1981, Register, all parties interested in the use of 1080 were given until January 26, 1982 to file a Statement of Position on all the issues involved and to also file a preliminary list of witnesses with a "brief narrative summary of their expected testimony." Actual testimony before the Administrative Law Judge began in March and is expected to last about 60 days. At the conclusion of the hearing, the judge will make a recommendation to Administrator Gorsuch on whether to resume use of 1080. The judge's recommendation is not, however, binding on the Administrator.

Animal Welfare Groups Against 1080

A coalition of animal rights advocate groups that includes The Humane Society of the U.S. (HSUS), Defenders of Wildlife, the National Audubon Society, and the Sierra Club, among others, is being represented at the hearing by a Washington-based law firm. These groups believe that the logic behind the decision to hold a formal hearing procedure is invalid since the vast compendium of evidence that led to the 1972 and 1979 decisions on 1080 and denning is still unshakably sound, that none of the new data obtained since then has changed the essential facts about the broad-spectrum toxicity of 1080 to the environment. They point to the thousands of pages of testimony compiled by the Fish and Wildlife Service in public hearings held in 1978 and 1979, prior to the 1979 statement by Secretary Andrus. The coalition now believes that "any major significant departure from these decisions must not be consistent with the existing record or plainly supported by a new record compiled with similar attention to the National Environmental Policy Act and other appropriate legislation such as the Endangered Species Act (1973), the Wildlife Act (1976), and the Administrative Procedures Act (1976)" (letter to Secretary Watt, November 19, 1981).

In contradiction to the findings of Kun cited above, the coalition points to several well-established facts about the primary pharmacology of 1080 and its subsequent distribution in the environment, as set forth in a 1972 EPA decision paper on the banning of 1080. Chemically, sodium monofluoroacetate can be described as a white powder that is soluble in water and also highly stable. It is therefore very persistent in ground water and intergraded into an ecosystem. Further, 1080 is readily taken up by the root and leaf systems of plants. The possible effects of this on grazing animals, both domestic and wild, are still unknown.

Monofluoroacetate is highly toxic for all species: a dose as low as 0.5 to 2 mg/kg of body weight acts rapidly on the central nervous system and heart, causing arrhythmias and convulsions. Since these effects come on too quickly to permit any effective treatment, antidotes are relatively valueless. Death, however, may not arrive until many hours after the initial poisoning. However, as noted by Natasha Atkins (wildlife biologist, then working for The HSUS), in her statement before the informal EPA hearings in July 1981:

The lethal dose for a canid is between 1-2 mg, while it would take 100-200 mg to kill an adult human. Cans are so susceptible to 1080 poisoning, foxes, wolves, and domestic dogs are potential victims. Some of these, notably the San Joachim Kit Fox, the Northern Kit Fox, and some sub-species of the Gray Wolf are endanger-
ed species. The endangered black-footed ferret and protected hawks and eagles could be easily attracted to the bait. These latter species are not as sensitive as canids, but it would take only marginally larger doses of 1080 to kill them. Since the guidelines for bait preparation recommend a minimum dose of 5 mg per single bait for coyotes, the consumption of the bait—little more than an ounce of bait material—could kill many of the less sensitive species.

Atkins also points out that there is a “serious gap in our knowledge about the cumulative effects of sublethal doses” of 1080. A government study in New Zealand (C.G. Rammell and P.A. Fleming, Compound 1080: Properties and Use of Sodium Monofluoroacetate in New Zealand, 1978) asserted that “repeated sublethal doses are reported to have a cumulative effect” in certain species, and that there is a possibility of chronic poisoning in humans who are exposed to 1080 and that we are all too aware of the tragic consequences on wildlife that result from continual sublethal doses of some toxicants, such as DDT.

It is also argued that the burden of evidence seems to indicate that the effects of 1080 as a secondary toxicant when other animals feed on the carcass of a 1080 victim are widespread. In a first-person narrative on his work with 1080 as a Federal predator control supervisor, Dick Randall (Defenders, October 1981) tells of his own experience with 1080 as a secondary poison.

In 1965, toxic chemicals (cadmium and zinc oxide) were added to 1080 to differentiate between animals killed by Government poison and those killed by “do-it-yourself” poisons, since the Government was being repeatedly sued by people who claimed to have lost pets through poisoning on public lands. Between 1970 and 1972, Randall checked the digestive tracts of wildlife carcasses found near the large-bait 1080 stations for signs of the tracer. He discovered that 50 percent of the dead birds (including six golden eagles) and 40 percent of the dead mammals contained tracer. Randall has also observed that canines can travel long distances after ingesting 1080. In the process, they often regurgitate the bait material as they travel, thereby ensuring distribution of the poison throughout the entire area.

Randall argues that the 1080 collar is a particularly poor mechanism for selective killing since its use has been found to involve dangerous problems such as “sheep chewing on the collar and poisoning themselves, dribble from the collar poisoning the wearer, punctures from thorns and barbed wire, and lost collars.”

On the issue of denning, the animal welfare coalition has also stated that it is “wasteful and scientifically absurd” (letter to Secretary Watt, November 19, 1981) because “it is axiomatic that in order to stop a coyote from killing sheep, it is necessary to target the coyote that is doing the damage. It is, therefore, equally axiomatic that killing 6- to 9week-old pups is wasteful and counterproductive since they could not possibly kill sheep.” The letter also points out that, contrary to Interior’s assertions (i.e., denning is accomplished by fumigating or shooting), flares, barbed wire, burning, and treble hooks are used routinely in killing new cubs in their dens.

Poisons, Denning, and Total Populations

For both ranchers and environmentalists, an especially critical aspect of any predator control program must be a careful consideration of the effects of a given method of control on the total population of predators—factors like numbers and stability of numbers, social organization, territorial imperatives, and hunting patterns.

Most observers have found that under natural conditions, where elements of social group hierarchy and social organization are not continually disrupted by predator control programs, the coyote is primarily a scavenger, limiting its predation to small rodents. However, when an established coyote pack is killed off, new, transient animals will move in to occupy newly vacant territory. During the period required for the new residents to establish patterns of hierarchy and social bonds, some animals are driven away from the usual food sources—mice and squirrels—and are forced to prey on any available domestic livestock (Defenders, October 1981). Coyotes also exhibit density-dependent natality. This means that a decrease in population tends to cause a corresponding increase in numbers of new births. In this way, coyote populations can increase by as much as fourfold. In her 1981 statement before the EPA, Natasha Atkins noted: “Reductions of predator populations also have been shown to upset certain interspecific balances. In New Zealand, where 1080 reduced populations of dingos, another canid species, significant increases in other species were detected. The Fish and Wildlife Service also reports [Predator Damage in the West: A Study of Coyote Management Alternatives, 1978] that increases in other predatory species coincided with 1080 reductions of coyote populations in the early 1950’s.”

Possible Alternatives

The 1972 (EPA) and 1979 (Interior) statements on 1080 and predator control policy both stressed the development and testing of alternatives. It appears that little actual work in this area has been done. Further, some of the obvious methods for keeping predators from sheep, many of which date back to prehistory, are not being used. Defenders (October 1981) quantifies the extent of this deficiency, based on data from the Department of the Interior’s publication, Predator Damage in the West: A Study of Coyote Management Alternatives (1978):

In the mountain states, herders are employed by only 16 percent of the ranchers running sheep on public lands. In the Great Basin states, only 24 percent hire shepherds to protect their livestock. Of sheep enterprises with more than 5,000 head operating on public lands, only 8 percent have constructed lambing sheds to shelter newborn animals. Fewer still use guard dogs...
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ote repellents, despite their proven ef
fectiveness.
Other promising alternatives to
wholesale predator destruction include
taste aversion chemicals, reproduction
inhibitors and anti-coyote electric fenc
ing (evaluated as highly successful in
terms of both cost and effectiveness in
The Journal of Range Management 33(5):
385-387, 1980). The mere presence of
burros or llamas also works to keep coy
otes at bay.
The Larger Picture
It is difficult to piece together ex
actly which political, legal, and funda
mental philosophical attitudes have
motivated the current initiatives on
Compound 1080 and denning by the ad
ministration. The earlier decisions were
endorsed by a multitude of expert wit
nesses and several consecutive changes
of government. This present initiative
does not even find universal approval
among the “sagebrush rebellion.” As Jim
Barron III of the National Cattlemen’s
Association said, “The coyote has nothing
to fear” from the new provisions (quoted
In fact, the present predator control
measures like 1080 and denning seem to
arise more from a philosophic bedrock
that goes deeper than economic
concerns or simple political expendi
ency. Consider this quotation from a re
cent briefing statement by Robert Jant
zen, Director of the Fish and Wildlife
Service:
If we in the Service seek to maintain
wildlife habitats, I feel we must be
prepared to act when wildlife, a pro
duct of that habitat, adversely af
fects man’s other interests.
First, use of the word “product” im
plies that animals can be considered as
consumer goods, like television sets and
"Int. J. Stud. Ani. Prob. 2(2) 1982
INT J STUD ANIM PROB 3(2) 1982
A Look at the LD50, 55 Years Later

For scientific, economic, and ethical reasons it is necessary to periodically reassess all toxicological test procedures, including the LD50 test. Tests that are not optimal or that have become obsolete because of new scientific knowledge must be changed or eliminated.

A review of the LD50 test shows that the precision of the procedure is dependent on the number of animals used. But even with large numbers of animals, there are considerable variations of the test results, because the numerical value of the LD50 is influenced by many factors, such as animal species and strain, age and sex, diet, food deprivation prior to dosing, temperature, caging, season, experimental procedures, etc. Thus, the LD50 value cannot be regarded as a biological constant. Through standardization of the test animals and the experimental conditions the variability of the LD50 determinations can be reduced, but never fully eliminated. There are several tests with which an approximate LD50 can be determined. These methods use fewer animals than the classical LD50 test, but their precision and reproducibility are sufficient for most purposes of acute toxicity testing. Through incorporation of physiological, hematological, biochemical, pathological, and histopathological investigations in the simplified test procedures with small numbers of animals, it is possible to markedly increase the informational content of the results with regard to the toxicological spectrum and the target organs of toxicity. Such studies have already replaced the LD50 test in large animals, such as dogs and monkeys. It is also desirable to replace the LD50 in rodents with such a procedure.

For the prediction of the human lethal dose and for the prediction of the symptomatology of poisoning after acute overdosing in man the LD50 test is of limited usefulness. An acute toxicity test with small numbers of animals combined with comprehensive studies of physiological functions and biochemical and histopathological examinations often provides more important information for emergency physicians and poison control centers. For the selection of doses to be used in subacute and chronic toxicity experiments the LD50 test does not provide consistent and reliable results. A simple pilot experiment with a few animals but repeated dosing gives more useful information. For the evaluation of special risks for the human newborn and infant the LD50 test is poorly suited. For the appraisal of pharmacokinetic behavior and bioavailability, the LD50 test gives only semi-quantitative, often ambiguous information. (Abstracted from G. Zbinden and M. Flury-Roversi, Arch Toxicol 47:77-79, 1981.)

Placenta a Practical Medium for Microsurgical Training

According to surgeon John C. McGregor (Department of Plastic Surgery, Bangour General Hospital, Broxburn, Scotland), the human placenta offers a satisfactory, economical, and readily available source of tissue for microsurgical training. The multiplicity of vessels of varying size gives ample opportunity for practice not possible by other experimental approaches in the United Kingdom. However, the placental preparations cannot provide experience of the continued patency of practice operations, such as microvascular anastomoses, but laboratory animals and Home Office licences are not required. This model offers a possible answer to the problem of a shortage of biological materials and will enable a significant improvement in the training of microvascular surgeons in all interested specialties. (Abstracted from J.C. McGregor, J Roy Coll Surg [Edinburgh] 25:213-216, 1981.)

And a Quarter for the Dryer

Mario Altissimo of Turin recently filed a European patent application for a dog-washing machine that looks suspiciously like an iron lung. The grubby dog is pushed into a cylindrical cabin, and his head is clamped down firmly by a collar. Once in place, the dog is treated to high-pressure jets of water (with a little soap added) and then dried with a blast of hot air pumped in through the cabin. Purportedly, the dog is not only thoroughly cleansed by the procedure but, the inventor claims, receives an "efficient hydro massage" as an added bonus. However, note dubious expression on face of dog.
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The Economics of Animal Welfare — A. J. F. Webster
The Language of Animal Exploitation — M. W. Fox
Thoughtful Use of Animals — H. Kitchen
Ethical Issues and Future Directions in Wildlife Management — J. W. Grandy
The Judaic-Christian Tradition and the Human/Animal Bond — J. A. Rimbach
The Controversy over Feral and Exotic Animal Control — N. Atkins
The Problem of Assessing Pain in Animals: Progress to Date — D. Murphy