



Creating the Nation's first BioPark

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Letter From the Desk of David Challinor
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The terrestrial world is a finite space that is becoming increasingly crowded. Humans often thoughtlessly modify the landscape to grow food for themselves and their livestock, thereby disturbing the animals that had previously occupied the area. The animals must either adapt to the new landscape or perish for they seldom can move elsewhere. Some wild animal species adapt so successfully to human-modified countryside that they manage to compete with humans for its use. When domestic animals become feral they can often successfully outcompete native wildlife and take over the habitat. In both cases humans, as the original landscape modifiers, must devise ways to try to put the animal populations back into a tolerable balance or suffer the inconvenience of "nuisance" populations. This letter will discuss examples of unforeseen animal population increases due to human alteration of the landscape and ways suggested for control.

Successful avian adapters are often exotic introductions such as sparrows or starlings, and control efforts have generally been unsuccessful. For example, starlings in flocks of up to a million congregate in roosts during the winter. They foul sidewalks of urban roosts with their droppings and in rural areas, where the roosts are often groves of conifers, the nitrogenous concentrations of droppings is so strong that many of the roost trees are killed. In the countryside one method of control is for the local fire department to spray detergent-mixed water on the roosting birds. This "sticky water" is hard to preen, and if the night temperature drops below freezing, many birds die. Despite several highly publicized and evidently successful efforts, night spraying has been abandoned, not only due to public complaints but also because these isolated control measures had so little effect on the total starling population. A related problem, of course, was how to dispose of several hundred thousand starling carcasses after a successful spraying.

As Redwinged black birds and related icterids assembled to migrate north, they used to gather in enormous flocks and feast on newly germinated rice in northern South America. This problem was largely solved by the development of rice with a shorter growing season that could be planted when the bulk of the birds had already migrated.



The non-migratory Canada goose, which now plagues expansive short grass areas such as city parks and golf courses, has caused immense problems. Geese are grazers and richly fertilized lawns are ideal feeding sites. Control methods include catching them in nets and transporting them miles away. However, they soon find their way back. Some golf courses use Scottish sheep dogs that try to round them up like sheep. Geese so hassled eventually do leave the dog-patrolled courses, but only to become a nuisance at some nearby non-patrolled site. So aggravating have these geese become that new experiments have included catching and vasectomizing male geese. In Westchester County, New York, 72 males were so treated, and since pair bonds last for years, this has been a successful but expensive and laborious way to reduce productivity. (Converse, K.A. and J.J. Kennelly, 1994. "Evaluation of Canada goose sterilization for population control." Wildlife Soc. Bull. 22(2): 265-270.) Other techniques have included spraying grass with a substance that repels geese, but rains eventually wash away the repellent and spraying has to be sustained.

As they were in "the old West," coyotes are a problem for sheep herders. Lamb carcasses have been treated with lithium chloride, an emetic agent, to see if coyotes could be conditioned not to prey on sheep. The coyotes appear to be too smart and refuse the bait, so this technique is not worth the effort. These canids are very adaptable and have spread in the last 30 years from the midwest to occupy a heretofore vacant niche in all the New England states, where they prey principally on possum, grey squirrels and deer fawns.

Generally the bigger the animal, the more visible their damage is to the human-controlled environment, but ironically these very same mammals produce great negative emotional response against measures to control them. Examples of this conflicting attitude toward nuisance animals are white-tailed deer and feral horses. The former have proliferated throughout suburbia and are now common even in densely populated areas. Beside the damage done to rose gardens (a favorite food), deer have recently become an increasing threat to human health as a host to the tick which bears Lyme disease. Deer cannot be successfully relocated because they are very territorial and would not survive if moved to sites already occupied by other deer. The automobile is an incidental but important "predator," but not a practical one. Effective population control, therefore, is limited to efficiently delivering an effective contraceptive agent or shooting to kill. Both approaches are fraught with risks to the animal as well as the human intervener. Thus it is only when public health concerns become great enough that drastic control measures are considered, and we are closely reaching this stage.

Progress in delivering contraceptive chemicals is being made, however, to control feral horse populations both in the west and on Atlantic coastal islands. In 1971 Congress passed the Wild Free-Roaming Horse and Burro Act that forbade harvesting these animals for dog food. Virtually no thought was given then about how to otherwise control horse populations which throughout the west can increase 10 to 20% annually. Such lack of foresight now causes the federal government millions of dollars annually to manage these herds.

Scientists working on publicly acceptable solutions have now developed a reasonably priced and effective horse contraceptive. Research has shifted from the emphasis on steroids as a contraceptive, which have been known to cause cancer in laboratory animals, to immuno-contraceptives. This approach is based on recently learned reaction of the zona pellucida, the protein coating of mammal eggs. When a horse or other mammal is injected with a serum made from the zona pellucida of another mammal, the recipient develops an immune response in its own zona pellucida. Antibodies are then produced to prevent any sperm cells, including ones from its own species, from binding to the receptor on the egg's membrane, thus preventing fertilization. The technique has been tried for several years on the Assateague Island feral horses, and the trials there have been successful enough to proceed with plans to use the same approach to control the 27,000 wild horses and burros out west. Delivery of the immuno-contraceptives will have to be refined, but it is encouraging to have come this far in the search for a way to curb a population expanding out of control. Much of the material on immuno-contraceptives discussed above came from a recent article in Bio Science (Vol. 44(7): 443-450), and for those who are interested in more details, I can send a copy.

The policy of reducing populations of large mammals by either immuno-contraception, steroid injection or vasectomies is still controversial. Hunters have argued that unhealthy does, for example, would have a poor immune response and thus be more likely to get pregnant than healthy ones; they claim poorer quality fawns would result. More research will be necessary to answer all the questions raised, but the trend toward human intervention seems irreversible. Human inadvertent manipulation of the landscape (e.g. golf courses or suburban housing developments adjacent to farms or woodlands) will result in as many unforeseen consequences as unplanned introduction of exotic animals. As a matter of fact, development houses which back up to woods are very desirable locations, but put the owners in a particularly sensitive position vis-a-vis deer populations. Drastic consequences often follow, but in time humans generally accept the necessity of reducing populations of competing

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animals. Eventually we may even realize that terrestrial space on earth is limited, and that unless we ourselves take steps to curb our own population growth, the animals that now appear to be under our control will have to bear the brunt of great reduction in numbers.

In my last letter about commensalism, I failed to check my definition of the term carefully enough and where I said "two or more organisms [that] live in close attachment...", I should have inserted "of different species" after organisms. Thus one macaque grooming another macaque is not being commensal, but a macaque grooming a langur, which incidentally happens in Sri Lanka, is. Have a good summer!

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