

The Conservation of Fauna

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Barry Commoner, the American ecologist has enunciated what he calls the First Law of Ecology — 'Everything is connected to everything else'. All the animals, all the plants, all the non-living substances in an area are interconnected and exist in a finely balanced dynamic state. Together, they constitute what is called an ecosystem, examples of which include small units like a pond, a marsh, a forest, a grassland and ultimately the largest unit of all — the entire biosphere itself.

Therefore, it should be clear that while for purposes of convenience we may discuss the problem of the conservation of fauna separately, the animals of any area, large or small, cannot be considered in isolation from the wider ecosystem to which they belong. In effect, this means that fauna cannot be conserved unless we conserve the total habitat in which the species can live. Thus the conservation of the fauna of an area requires the maintenance in natural form of an extensive range of different functional ecosystems.

Too often, especially in countries such as ours, ideas of conservation are centred round the protection of certain endangered species of large animals — mammals and birds and some of the other vertebrate animals. Most people are familiar with such animals and their observation in the natural environment has become a popular pastime. However, the major problems of faunal conservation have their focus elsewhere. There are, at least, about two million species of organisms living in the world today. Obviously not all of these are essential for the continuation of life on this planet. Some of these organisms are even harmful to man. But we do not know, for certain, which species are essential and which are not. We also have no knowledge about which part of the genetic heritage embodied in existing species will be most valuable for future evolutionary processes. We have no alternative, therefore, but to ensure the continued survival of the specific constellations of fauna which are presently characteristic of various natural habitats.

The importance of inconspicuous invertebrate animals in nature's schemes can be illustrated graphically by reference to two examples. Everyone knows what an earthworm is, but few understand the immense contribution that these animals make to the living-world. In fact, Charles Darwin said, "It may be doubted whether there are any other animals which have played such an important part in the history of the world as these lowly organised creatures." Earthworms live in burrows in the soil and eat rotting plant material. In the process of feeding and making burrows, they swallow soil and pass it out, after processing, as casts. Casts, which may amount to over 10 tons per acre per day, are much more fertile than unprocessed soil. Moreover, the burrowing of earthworms make soil more porous to air and water.

The importance of conserving earthworm populations cannot be minimized. The second instance of the importance of the smaller components of a fauna is that of the dung beetle. Dung beetles feed on cow pats, as also do their larvae. The activities of these animals help to intergrate the cow pats into the soil and make the soil more fertile. In Australia, there are native beetles that live on kangaroo dung, but none that live on cow pats. So cow pats can last for years and cover pasture ground making it unproductive. Therefore dung beetles are being introduced into Australia specifically to process cow pats.

From the fore-going discussion, it should be evident that there are two major aspects to the problem of faunal conservation. The first, and perhaps the less important, is the problem of conservation of large species of animals, mainly vertebrates. The second and more fundamental problem, is that of conservation of the totality of faunal constellations of given areas in as extensive and as unmodified a form as is practicable. Unfortunately, much less thought, publicity and expense has gone into the second than into the first problem.

The stage of animal evolution is littered with the fossils of millions of animal species that are no longer extant. These are forms that appeared at some time in the past, lived for greater or lesser periods of time, and died out. This cycle of emergence, existence and expansion and final extinction, is a natural phenomenon which is an integral part of the world of life.

One has only to remember the great hordes of dinosaurs that ruled the earth for many millions of years and finally disappeared about 70 million years ago. The mammals, themselves, are said to be past the peak of their expansion. Many giants among the mammals, like the woolly mammoth and the ground sloth, have become extinct without man's helping hand. However, while we may accept the inevitability of natural processes, it is alarming that man has gone out of his way to remove large numbers of animal species, especially of birds and mammals. It is estimated that in the last 300 years, man has wiped out over 200 species of mammals and birds. The rate of destruction has accelerated during this century and it is suggested that perhaps one species becomes extinct somewhere in the world each year. It is true that in many cases the extinction of these species does not affect the continuance of life as a whole on earth but there can be no doubt that mankind is the poorer for the loss.

Some examples of extinction or near extinction of fauna may be quoted. In most cases these can be attributable, in the early years to ignorance of consequences but increasingly in recent years to man's greed for material gain.

(1) The northern fur seal *Callorhinus ursinus* breeds on the Pribiloff Islands in the Bering Sea. Herds of several million seals were discovered there in 1786. Twenty years of indiscriminate killing reduced the species to near extinction. Regulations were introduced but populations declined to about 125,000 by 1911. Further conservation measures succeeded in saving the seal and by 1958 populations had risen to nearly two million, in spite of controlled cropping.

(2) The blue whale 100 feet long and 160 tons in weight is the largest animal that has ever existed on earth. But three whaling nations Japan, Norway and the Soviet Union have brought these wonders of nature to near extinction. Catches of blue whale have declined from 5231 in 1950 to none in 1967. Populations of other types of whales have also declined alarmingly.

While it is possible to quote a number of cases where various animal species have been wiped out or brought to near extinction, there is certainly a concerted effort among many nations to take effective corrective measures. Perhaps the best examples of strict conservation measures are those afforded by countries like Australia, and New Zealand. Australia, having been isolated from the rest of the world for a very long time, has a unique collection of fauna. The native mammals are all marsupial or pouched mammals, unique to the island continent. Within Australia, these animals play the part in the ecosystems which, elsewhere, are carried out by placental mammals. Rigorous conservation and protection measures have kept this unique fauna reasonably intact.

The fauna of Sri Lanka is not by any means an exceptional one, when compared to the fauna of Australia, New Zealand and Madagascar. Sri Lanka separated from the Indian sub-continent in late Miocene times, the south-western section being the first to separate. The fauna of Sri Lanka, therefore, bears considerable affinity to that of India. This applies especially to the fauna of the Dry Zone areas. The fauna of the wet hill zones is more distinctive though there is some affinity with the fauna of the Malaysian tract. (Crusz, 1973).

The Sri Lankan fauna includes some 628 known species of terrestrial vertebrates including 84 mammals, 379 birds, 133 reptiles and 32 amphibian species. (Crusz, 1973). Eisenberg and McKay (1970) in their check list of recent mammals of Ceylon list the following mammal species as endemic.

Endemic species confined to the hill zone:

Shrews — *Feroculus feroculus*, *Solisorex pearsoni*, *Crocidura miya*

Rodents — *Rattus montanus*, *Rattus ohienis*
N.B. *Feroculus* and *Solisorex* are endemic genera.

Endemic species more widely distributed in the island:

Primates — *Presbytis senex*

Carnivores — *Paradoxurus zeylanicus*

Rodents — *Mus fernandoni*, *Mus mayori*

In their study of mammalian distribution in the island, Eisenberg and McKay (1970) have recognised seven vegetational zones as proposed by Mueller — Dombois and Sirisena (1967) and other authors. These are listed as follows:

Monsoon Scrub Jungle — extreme north and northwest
— extreme southeast
Monsoon Forest and Grassland
Intermonsoon Forest
Rain-forest and Grassland

— below 3000 ft.
— above 3000 ft.
— above 5000 ft.

Much of the endemic vertebrate fauna of Sri Lanka are confined to the rain forest with about 25% confined to elevations above 5000 ft. Commenting on the great number of sub-species of mammals identified for Sri Lanka, Eisenberg and McKay (1970) indicate that their status is uncertain. They suggest that clinal variation from highland wet zones into lowland monsoonal rain forests may account for much of the variation on the basis of which many of the sub-species have been defined. They state that further study of this phenomenon will undoubtedly eliminate many forms now defined as valid sub-species.

Compared with South India the recent Sri Lankan fauna is less diversified. However, it was much more varied during the Pleistocene. Fossil or sub-fossil remains indicate that the island once had a hippopotamus *Hexaprotodon*, two species of the genus *Rhinoceros*, the Indian lion *Panthera leo*, the red dog *Cuon javanicus* and the gaur *Ribos gaurus* (Deraniyagala, 1958). It is a well known principle that diversity of a fauna and especially of large mammals, is related to the size of the land area occupied. Under natural conditions the island has not been able to retain many of its larger mammals. Today, we are left with but a few which include *Elephas maximus*, *Melursus ursinus*, *Axis axis*, *Cervus unicolour*, *Bubalus bubalis*, *Sus scrofa* among the terrestrial forms and *Dugong dugong* among the aquatic animals. Taken as a whole these do not form our exceptional assemblage of mammals but they are all we have got and it becomes all the more important that we should make every effort to ensure their continued existence.

In pre-civilisation, man was just one member of the fauna. His impact on the environment was no greater than that of any other species. With the advance of civilisation, development of agriculture, industry and urbanisation, man has now to be regarded as an epidemic disease which is rapidly destroying the environment, making it inhospitable, both for his own species and all others. In our own country, the human population load is already in excess of that which the environment should be called upon to support. It is increasing further.

Massive agricultural development projects have to be implemented and extensive industrial development has to be undertaken in order to support the demands of this expanding population. Inevitably, the natural environment is affected. Land areas under natural vegetational cover with their supported fauna, vertebrate and invertebrate, large and small, will be rapidly eroded to give place to agricultural production. Natural waters, both fresh and brackish as well as the sea will be increasingly subjected to pollutants of various sorts. In addition, the human population that will continue its expansion in numbers and into land space, will tend to take a direct and heavy toll on the already limited fauna.

Much has been written and spoken about the Ceylon Elephant and its protection in the recent past. It is not necessary to restate the entire case here but this species is a classic example of the havoc that can be wreaked on a valuable national asset by improperly planned clearing of natural environments. The elephant thrives in regions where green food and water are plentiful — regions like the southwest and central regions of the island. However, they have been displaced from these regions into drier, inhospitable areas. The animal needs extensive acreages for feeding and for migrations. These have now been severely restricted. The elephant is a slow breeder with a gestation period of 22 months and unfortunately, it rarely breeds in captivity. Losses sustained by existing populations cannot be easily recouped. Taken all in all, prospects seem to be bleak for the Ceylon Elephant. It is even more important to realise that the fast disappearing elephant, while being a cause for alarm in its own right, is symbolic of the disappearance of a whole complex of faunal elements, which though less imposing are ecologically the more fundamental.

How do we set about devising solutions to the overall problems of faunal conservation? It is not possible to cry halt to all development activity. Also, as indicated at the beginning of this article, conservation of fauna is, in practical terms the preservation of whole ecosystems. A well planned, integrated and sustained programme is urgently required. The components of such a programme would be the following:—

1. A documentation of natural ecosystem country — wide on the basis of which firm decisions must be made that certain designated areas must be preserved in their natural form. These would not include forests only, but also natural areas such as grasslands, mangroves, marshes, sea coast and so on. For instance, there is now general agreement that Montane forests and forests like the Sinharaja must remain inviolable.
2. It is not enough to mark out National Parks, Strict Reserves and Intermediate zones. It is essential that sound and extensive ecological studies must be made in these areas. Information gathered from such studies can then be used for sound management of the Parks. As natural environments become increasingly restricted, the management of those that remain is a matter of paramount importance. The Department of Wild Life does a herculean job at the moment with very limited resources of equipment and personnel. It is very essential that the trained scientific cadre of the Department must be increased manifold. It is not a matter for pride that we are largely dependant on visiting teams of scientists for basic information on our wild-life and parks. To some extent we have taken steps to rectify this short-coming. In 1978, a corporate effort was made to study some of the problems of the Yala Park by scientists from the University of Aberdeen, the University of Colombo and personnel of the Wild Life Department. (Joint Aberdeen and Colombo, Universities Expedition in Sri Lanka 1978).

A similar study will be made this year and it is hoped that the National Science Council will support extensive continuing ecological studies which are basic to proper management of our National Parks.
3. The habits, the movement, the problems of our larger mammals have to be closely monitored. Recently, a herd of elephants in the Mahaweli Development area was driven into a new home range. The progress of these animals needs to be closely followed on sound scientific lines. This calls for additional staff and facilities for the Wild Life Department and close collaboration between all departments and agencies which have anything to do with forests.
4. It is necessary to apply very stringently all existing regulations relating to forests and fauna and to tighten up where these are ineffective.
5. It is necessary to impose a total ban on exports of fauna from this country, at least until such time

as a broad assessment is made of the inroads that have been made into our natural heritage by uncontrolled export. The concept that it is sufficient, to stop the killing or removal of 'endemics' and endangered species alone is wrong.

6. It is necessary in all future development programs to make adequate provision for planned protection of the existing ecosystems as part of the initial planning process.

In conclusion, it is necessary to emphasise that the time has come for us to base our planning and decisions on the conservation of the environment on sound scientific information. The Departments and Institutions that have the capability of collecting this must be strengthened. The cadre of such departments must include well trained scientific officers. As the natural environment shrinks, it becomes increasingly valuable. Let us treat it as a national heritage that has to be very carefully nurtured.

REFERENCES:

- Crusz, H.—(1973) — Nature Conservation in Sri Lanka—In Biological Conservation 5 (3), 199-208.
- Deraniyagala, P. E. P. — (1958) — The Pleistocene of Ceylon —Ceylon National Museums, Natural History Series — 164 pp.
- Eisenberg, J. F. & McKay, G. M.—(1970)—An annotated checklist of the recent mammals of Ceylon with keys to the species—Cey. J.Sc. 8 (2), 69-99
- Joint Aberdeen and Colombo Universities Expedition in Sri Lanka—(1978)—University of Aberdeen, 193 pp.
- Mueller — Dombois, D. & Sirisena, U. A.—(1967)—Climate map of Ceylon; Surveyor-General's Office, Colombo 5, Sri Lanka.