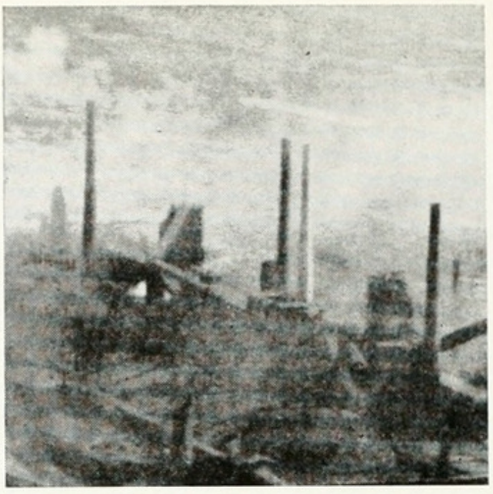
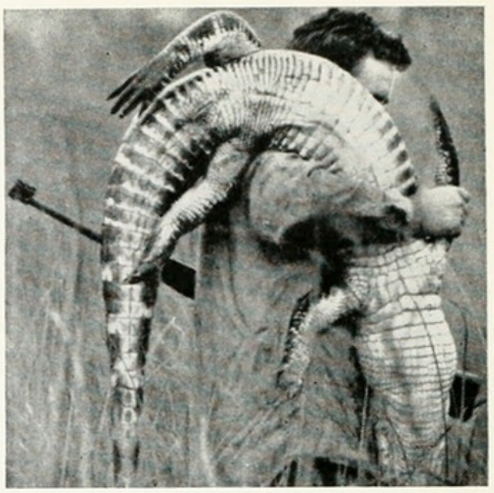
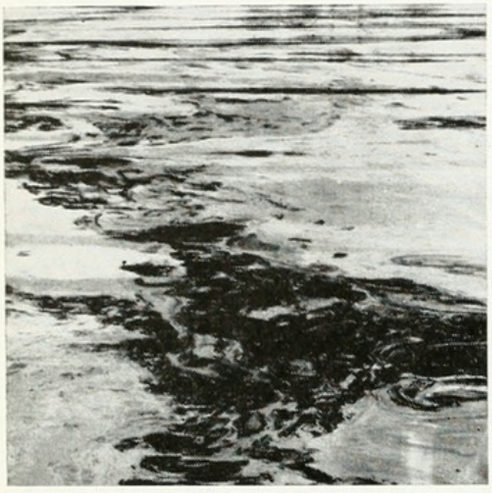
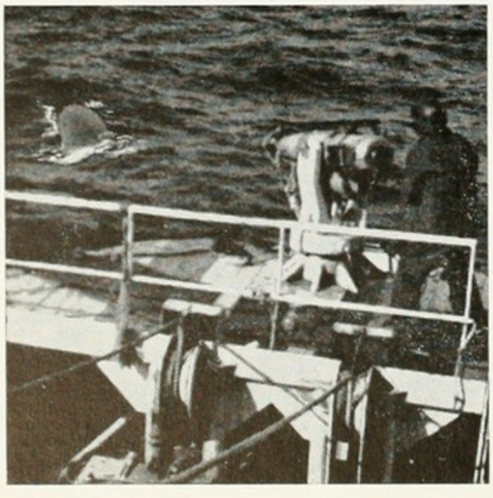





endangered and disappearing animals

melvin a. traylor







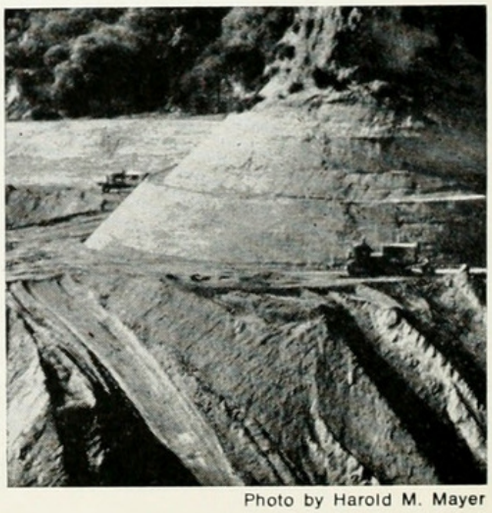


Photo by Harold M. Mayer

As custodians of systematic collections that ideally will contain representatives of all the known species of animals, the staff of the Zoology Department are acutely aware of the many species that have become extinct in historical times, or that are now rare or endangered. It is not that extinction is a new phenomenon. Evolution and extinction are almost as much characteristics of species as birth and death are characteristics of individuals. But the rate of extinction has become so accelerated with the advent of modern man that there is a real fear that whole faunas may disappear before their very existence is known to science.

Although natural extinction is a commonplace, as witness the disappearance of the dinosaurs, it is such a gradual process that recognizing an example in the field is difficult. We can, however, recognize certain factors that make a species vulnerable. The most important factors are a restricted range and a high degree of specialization to a particular habitat, without the ability to adapt to change. The restricted range puts the species at the mercy of a natural disaster. For example, whatever species of land snails were confined to the island of Krakatau (between Sumatra and Java) were quite literally blown away in the explosion of that island, and only those that were more widespread survived to repopulate it later. Kirtland's Warbler is an example of a highly specialized species that is successful in its individual niche but will disappear when the habitat does. It will nest only under Christmas-tree sized jack-pines that have grown up after a recent burn. A prolonged wet spell of several years might eliminate this habitat, and the warbler with it.

The same factors that make a species prone to natural extinction make it vulnerable to man. Over 93% of the birds extirpated in historic times have been island forms. Within their limited range, they have been beautifully adapted to their special environments and highly successful, but their inability to adapt to a new man-made environment or to move elsewhere spelled their doom.

When I speak of "natural" extinction as opposed to "unnatural," caused by man and his civilization, I am making a distinction that is a little furry around the edges. Man has been a predator throughout his evolution, and as such has always had an impact on the animals around him. We like to think of the North American Indians as living in harmony with their environment, not putting more pressure on the native fauna than it could safely bear. And so they were at the time of the arrival of Columbus; but it was not the same Pleistocene fauna that had greeted the ancestors of these Indians when they arrived from Asia some 25,000 years before. At that time great herds of horses and camels ranged the central plains of North America, and mastodons and ground sloths still survived, as did many of the old predators like the saber-toothed tiger and the short-faced bear. Man, with his stone axes and spear points, was the super-predator on all these, and none was able to survive his coming. The balance between the Indian and nature was achieved through a drastic type of natural selection, much accelerated because of man's arrival full-blown rather than through gradual evolution. Only in Africa, where man evolved along with the rest of the fauna, were the Pleistocene animals adapted to him and able to survive.

Modern man is still a predator, and on a much larger scale. The interaction between his civilization and the non-human world is partly the continuing process of selection that will lead to a new balance between them. However, in our Western culture a new element has been introduced that has fundamentally changed man's view of nature: it is the ethic that sets him apart and pits him against nature as an antagonist. The Judeo-Christian belief that the world was created for man's use and enjoyment has been perverted to the feeling that nature is our enemy and must be broken to our will; that man was a creation apart and stands in opposition to the rest of the world. Our literature abounds with references to "conquering" nature, "subduing" the wilderness, "taming" the rivers, "wiping out" the vermin. In the New World particularly, subjugation of a whole continent was our avowed aim. Only in the past few decades has the role of man as a part of the natural world begun to find acceptance, and have concerned individuals begun to take stock of the havoc that man has wrought.

Primitive man accomplished his extirpations with a stone axe and spear. Modern man has added to this arsenal a conscious will toward conquest as well as a variegated array of much more devastating weapons—modern firearms and transportation, axes and chain saws, the plow, cities, factories and their pollution, pesticides, domestic animals, pets, his ubiquitous commensal the rat, and other introduced animals. Each of these has at some time or place seriously endangered or exterminated some species, and the process is even now accelerating. In the less than 300 years since that epitome of extinction the last Dodo died, 106 species and subspecies of birds and 40 species of mammals are known to have been extirpated, and today the Red Books of the International Union for the Conservation of Nature list 191 birds and 161 mammals as endangered. Taken together, these figures represent roughly 3.5% of the known birds and 5% of the mammals, a frightening rate in view of the tens of thousands of years needed for a new species to evolve.

But man seldom sets out deliberately to exterminate an animal. Those that he does are usually a health menace or agricultural pest or a competitor which he feels he cannot tolerate, such as the wolf or golden eagle. Most of the larger animals on which man is a direct predator with his guns and traps become endangered because he hunts them, either through ignorance or greed, far beyond the point at which the remaining population can replace the individuals that are taken. We can see this now in the serious depletion of the various spotted cats—leopards and cheetahs—and of the crocodiles and alligators, all hunted at the whim of fashion. Even more spectacular, though less well known, is the drastic reduction in the whale populations of the world. With the coming of the bomb-harpoon and small steam-chasers, and more recently the factory-ship which enables the chasers to remain at sea indefinitely, the odds against the whales became too great. First the Right Whales of the northern seas were hunted to the point where there was no commercial return; then in the Antarctic seas the Blue Whale, Humpback, Pygmy Blue, and Fin Whale were each decimated in turn. The last remaining commercially valuable whale, the Sei, was then attacked, and over a third of the remaining stock was taken for two years running. The International Whaling Commission finally stepped in and set realistic quotas, but whether the action was soon enough to save the endangered species will not be known for some time. The tragedy is not only in the loss of magnificent animals, but in the waste of a valuable resource. If only 10% or 15% of the original herds had been cropped each year, we would still be reaping a liberal harvest of meat and oil for hungry peoples.

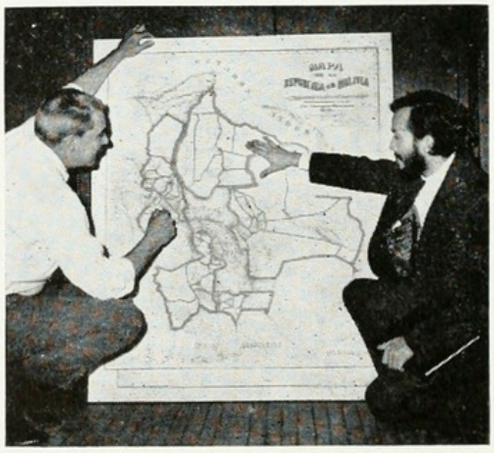
Although we are most aware of direct exploitation of the larger mammals and birds, either commercially or for sport, many more species are endangered merely as a by-product of man's activities. Foremost among these activities are the destruction of forests for lumber or agriculture and the plowing of virgin prairies for farming. The magnificent beech forests of the Ohio valley, so continuous that "a squirrel could travel from the Mississippi to Pittsburgh without setting foot on the ground," are gone except for a few carefully protected remnants, and with them went the ecosystem of organisms dependent upon them. A spectacular example of a species endangered by the destruction of virgin forest is the Ivory-billed Woodpecker, the

largest of our woodpeckers. Unlike its more adaptable cousin, the Pileated, the Ivory-bill must have extensive stands of virgin timber to survive. Consequently it is now restricted, in very small numbers, to the cypress forests of east Texas and western Louisiana, and possibly Florida. If these forests go, the bird goes with them.

If the birds of continental areas are vulnerable to change of habitat and the pressures of man, those of small islands are much more so. Evolution of island species in harmony with their environment often means that in the absence of predators they lose the wariness or weapons that protected them on the mainland. They are defenseless when new enemies are introduced. Island birds must cope not only with the changing environment when man arrives, but with his invariable commensal the rat, which plays havoc with the endemic terrestrial animals. Man may more deliberately introduce goats or pigs or rabbits, all destructive of the vegetation, and often directly predatory on the local fauna. A measure of the destructiveness of this combination is found in the Mascarene Islands east of Madagascar. Besides the Dodo, there were 27 species of birds found only in this archipelago; 24 are now extinct, and the remainder survive only in small numbers in scattered remnants of mountain forest.

The weapon of man's final assault against the environment, one which directly endangers himself as well as the wildlife, is the pollution caused by his cities and factories and pesticides. For evidence of its force we need not go beyond the newspapers' daily listings of levels of air pollutants, which frequently exceed the "safe" levels, or announcements that beaches are closed because of filth in the water. The effects of water pollutants have been building up for decades, as witness the slow death of Lake Erie, but only within the last decade have the effects of persistent pesticides been apparent. The extirpation of the Peregrine Falcon as a breeding bird in the eastern states first showed how the pesticides accumulate to dangerous levels in large predators, and now that we are alerted we realize how widespread this phenomenon has become. Since man is the ultimate predator, this danger points directly to him.

What is the role of Field Museum's Zoology Department staff in the face of this accelerating deterioration of our world? Besides our humanistic obligations as individuals to try to pass on to succeeding generations as much of the natural world as possible, we have a special obligation as biologists to preserve examples of all forms of life and a knowledge of the way they live. The mere fact that we are able to discuss extinct species shows that our predecessors succeeded in collecting at least one example of each, and in many cases of island forms a single specimen 150 years old may represent our only knowledge of the organism. Of those that became extinct before a specimen was preserved, we have no knowledge. Since this is true of easily observed and studied animals like birds and mammals, it is vastly more so of the insects and mollusks and other "insignificant" groups. As Dr. Solem pointed out in an earlier issue of the *Bulletin* (April 1970), 10,000 species of mollusks may have been exterminated without the world being aware of them. Even when they are aware, the public will always be more concerned about the population of the Whooping Crane than about the hundreds of species of land snails that are lost when a section of the Everglades is drained. Yet it is probable that study of these snails can tell us more about speciation and ecology than study of any single species of bird, no matter how spectacular it is. In fact, parasites—the lice and mites and roundworms that were specific to an extinct host—may be of more biological interest than the host itself. Often the parasites can give good clues to the phylogenetic relationship of the host, but that is possible only if the host species continues to exist; when it dies out, it carries its parasites with it. Ornithologists would dearly love to have the bird-lice from a Dodo, to gain some hint of the pigeon from which it evolved.



The author discusses with Roy Steinbach areas in Bolivia where the Steinbach family will make collections.

Our concern as scientists, therefore, is with whole faunas and their ecology as well as with individual species. This does not mean that we are not anxious to obtain specimens of endangered forms, for they will be the only permanent record of species if they are extirpated. We would not, however, put further pressure on a species by rushing out to collect more specimens just because we believe it will become extinct; this would help to make the prophecy self-fulfilling. Specimens should come from zoo animals or accidental deaths, such as the road-killed red wolf we recently received, one of our rarer North American mammals. Our scientific explorations should concentrate effort on endangered habitats and the whole faunas that are dependent on them. Many of these are in the tropical regions of Africa and the New World, where the developing countries look upon their forests as expendable resources. In Africa many of the mountains have montane forests on the upper slopes, isolated from each other, like islands in a tropical sea. Each of these forests has a rich endemic fauna that should be studied *now* while the animals are still abundant. If we wait until destructive exploitation of the forest for lumber or charcoal or agriculture has already threatened the animals, the original ecology will be too far gone to study.

The same situation prevails on the eastern slopes of the Andes in South America, where the forests are being destroyed for resettlement projects. This is an area of particular interest to many of our curators, and we are now initiating a program in Bolivia to make a faunal survey of the eastern forest region. Collecting will be done by the Steinbach family of Cochabamba, the third generation of which is now involved in scientific exploration. All major groups of animals—mammals, birds, amphibians and reptiles, fish, insects, and mollusks—will be sampled, as well as their parasites. Botanical collections will also be made so we will have a habitat in which to frame our creatures. We hope we will be able to develop a comprehensive picture of a tropical fauna, before the ecology has been distorted by man's activities.

As biologists, we are interested in natural history for its own sake, and would study our birds and snails and parasites whether they were endangered or not or in any way involved in man's economy. But we do not live or work in a vacuum. Knowledge of ecology—the interrelations of organisms and their environment—can be a weapon to oppose the type of thoughtless destruction that has gone on in the past. Our mechanized, industrialized civilization cannot reverse itself. Even if the size of the human population of the world were to stabilize today, we would still have to seek new food sources to adequately feed everyone. What seems to us wanton destruction of tropical forests is actually a desperate, if short-sighted, effort to meet the immediate needs of undernourished people. What we must do is use our knowledge to plan our future activities so that we do not take more from nature than she can renew—so we can hand on to the future a balanced world rather than a disintegrating one.

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