

Bit by bit the environment changes, variety lessens, and species disappear. Right, extinct Carolina Parakeet.

■ PERHAPS the saddest aspect of being the curator of a biological collection today is the glum knowledge that each year more of your special world vanishes forever. Its passing causes not a ripple.

Sure, some things are saved. Heroic publicity measures and dedicated fund raising saved for the "Prairie State," Illinois, one scrap of virgin prairie, Goose Lake in Grundy County. One stand of white oaks, Beall Woods, stands near the Wabash River rather than lying as charred barrels in Scotland aging whisky.

I like Scotch whisky, but I also like forests. Our world needs both. The Passenger Pigeon is gone and books are written about it. The Whooping Crane barely survives. *Life* magazine (January 9th, p. 84) includes under "trivial trends that point the way" the fact that Whooping Cranes increased from 33 in 1960 to 55 in 1970.

Yet, when I say that man has wiped out 10,000 species of insects and snails in the last 200 years, at most there are



## EXTINCTION STRIKES 10,000 SPECIES, MAN REMAINS UNCONCERNED

by Alan Solem, Curator of Lower Invertebrates

raised eyebrows. "So what," is the usual comment. Even those most devoted to the preservation of natural areas and the saving of rare and endangered species are unaware of this fact. Under my Christmas tree this winter was a copy of the beautifully-produced "Wildlife in Danger" by James Fischer, et al. This surveys the current status of endangered species as determined by the International Union for Conservation of Nature and Natural Resources. It has 149 pages on mammals, 152 on birds, 14 on reptiles, 3 on amphibians and 13 on fishes. There is no mention of lower organisms.

It is unrealistic to expect otherwise. Western man long has operated with the view that the world is here for human exploitation. This is epitomized by Pope's "The Proper Study of Mankind Is Man." We are more than uncaring. We are almost totally anthropocentric.

*Webster's Unabridged—*

*Anthropocentric: man as the center or ultimate end.*

More like man, more interest; less like man, less interest. This shows in our language, our actions, and even the staffing of Field Museum (see boxed table). Yet cracks appear in our egocentric armour. "The Naked Ape" and "The Territorial Imperative" became best sellers by calling attention to the animal aspects of human behavior. Pollution is past the point of being ignored. It is a basic fact that no organism can live on its own excrement. Look at our rivers. Breathe our city air. We have been trying very hard. The tidal waves of debris from our sewers, smokestacks, automobile exhausts, garbage cans and factory waste outlets threaten disasters. Lip service to a clean environment replaces flag and motherhood in political speeches.

We are learning a lesson known to primitive tribes for many centuries. Man *shares* this world with other organisms. We need them and they need us. The oxygen we breathe is a waste product of plants. The carbon dioxide plants use is a waste product from animal bodies. Energy from the sun is used by algae and land plants to make organic chemicals. Animals get their organic chemicals either by eating plants or by eating animals that have eaten plants. Decay organisms, mainly bacteria and fungi, reduce the dead bodies of animals and plants to simple chemicals. These are then used again in the cycle of life. All life on earth is linked into a vast interdependent ecosystem.

If we break this chain of inert to living to inert, life on earth would cease. Warnings by ecologists of dangers from pesticides, thermal pollution and habitat destruction appear in mass circulation magazines. By 1972 the words "ecology" and "ecosystem" may be as familiar as "astronaut" and "spaceship." We must have plants, and animals, and birds, and even snails and insects. Yet exploding human populations continue to encroach on the environment. A fancy way of saying wipe it out.

It occurs in big ways. And in small ways. The next 30 years will see all forests in Central America cut down and gone forever. Incredible and pessimistic? Not to a biologist who has been there. Urban areas grow. Suburbs build up to uninterrupted vistas of manicured grass, concrete and asphalt, at most sprinkled with trash. Many biologists of my generation were weaned on vacant lots, redolent with dusty weeds on hot August days, singing with myriad insects and birds. Between digging forts and playing hide and seek in the long grass, our eyes were caught



by the red and black of a milkweed beetle, the grace of a fluttering butterfly, or even the shimmering back of a resting slug beneath an abandoned cardboard box. Curiosity, interest, avocation, profession followed in tidal sequence. Now these lots have houses, or at best are neatly asphalted play lots, routinely sprayed against mosquitos.

Bit by bit the environment changes, variety lessens, and species disappear. It may be robins from a city, buffalo from the Great Plains, or snails and insects from "some enchanted islands" rising dot-like from the vast Pacific. For here alone our 10,000 species vanished, mostly within the span of living centenarians. Item: In the 1870's an American missionary, Andrew Garrett, collected 13 species of endodontid land snails on Rarotonga in the Cook Islands; in 1965 there were only 2 remaining. Item: Living endodontid land snails were found on Mangareva, Gambier Islands in the 1840's; in 1934 only the dead remains of 25 species were found. Item: Of perhaps 125 species of Hawaiian endodontid land snails still living before 1850, probably less than a dozen exist today. Item: In 1948 a Hawaiian entomologist, Elwood Zimmerman, could state concerning the native insects "that to say a third or more of the species are now extinct would be no exaggeration." Since there are perhaps 6,000 species of Hawaiian insects known from collections in this century, this means a mere 3,000 species were gone by 1948. More have vanished since. Add another 2,000 for the Marquesas, denuded of forest to 3,000 feet by the mid-1920's, plus the loss of 2,000 species from the Society Islands—Tahiti, Moorea, Bora Bora. There are still the Austral Islands, Cook Islands, Samoa, Fiji, their vanished species unreckoned. The leeward dry regions of the Hawaiian Islands contained 60% of the native tree species. These have

been stripped to nearly 5,000 feet. How many species gone? We don't know. But plants, and snails, and insects combined? Ten thousand is a modest estimate.

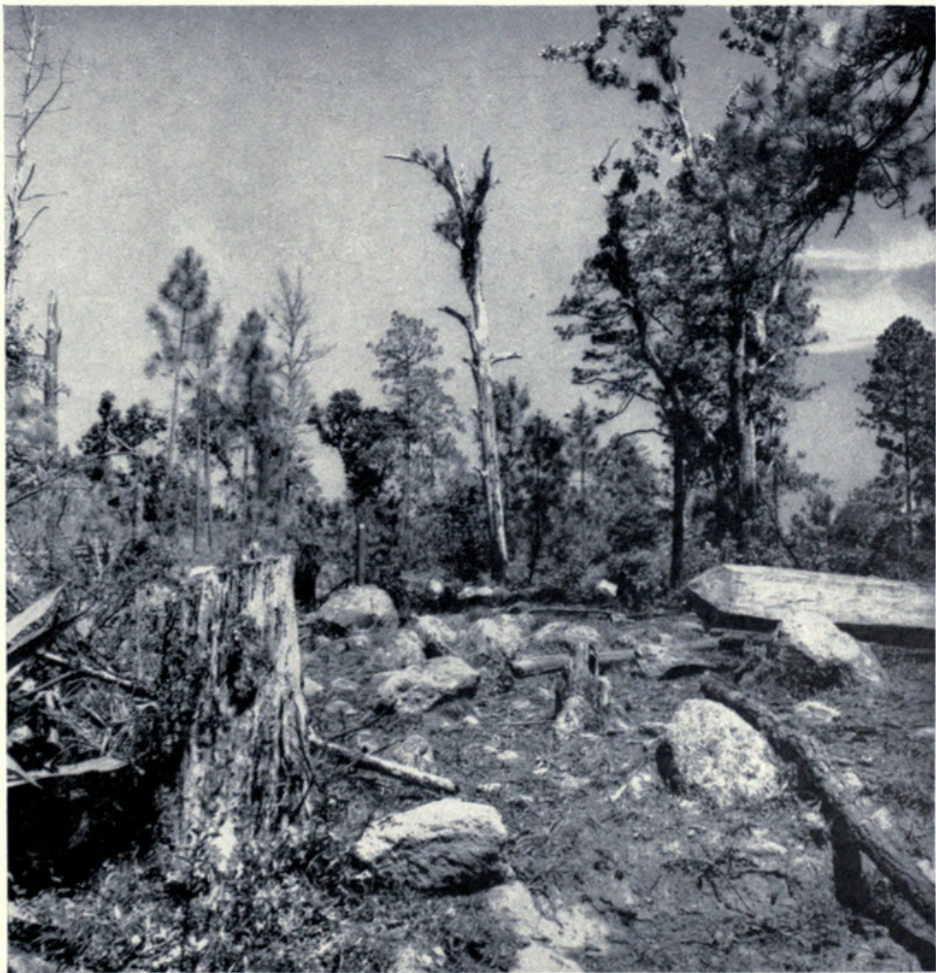
Why did they go? It was not only by deliberate hunting. It was not all the fault of Western man. When the Maoris reached New Zealand about 950 A.D., there was a bird fauna of perhaps 150 species. The large and edible moas were hunted and killed, but this covers only about 20 species. Another 30 species disappeared by 1900 because of habitat disturbance.

Habitat disturbance brings vision of bulldozers and factories. On islands it is much simpler. Cattle trample through native forest. An ornamental garden fern goes wild and chokes out thousands of acres a year in Hawaii. A potted garden plant from overseas had a few unnoticed ants. Within a decade *Pheidole megacephala*, a voracious species of ant, occupied lowland Oahu, destroying insects and snails alike. For several years I've been studying endodontid land snails. On Pacific Islands there is a neat and simple equation:

Introduced ants = no ground dwelling endodontids. Even more so for many insects.

So I'm writing about the species that were, or occasionally (still) the species that barely are. On Upolu, Western Samoa, a beautiful little land snail called *Thaumatodon hystricelloides* was common in the woods behind the port of Apia in 1865. In 1965 it was restricted to high mountain peaks, the only areas from which introduced ants still were absent. The question is not *will* it become extinct, but *when*. Islands were treasure troves of evolution, but the carelessness of man's introductions threatens to turn them into wastelands. Eighty-five of 94 birds species thought to have become extinct since 1900 lived on islands.

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The next 30 years will see all forests in Central America cut down and gone forever.  
PHOTO BY DR. LOUIS WILLIAMS

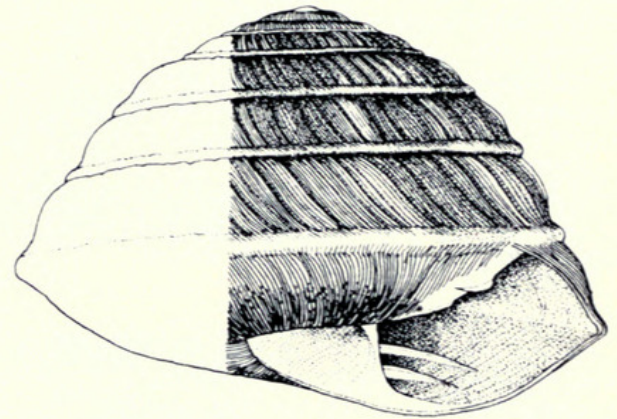
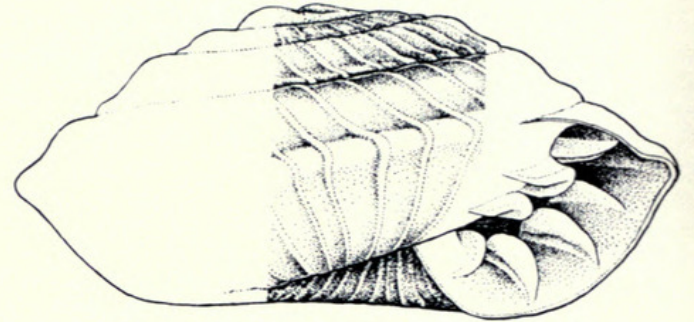
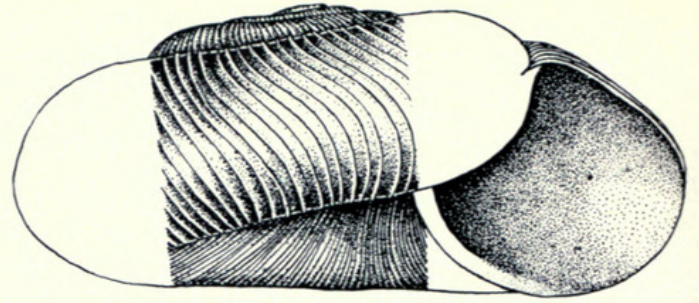


But extinction strikes closer to home. A new subdivision in California results in bulldozing the only known habitat of a land snail into oblivion. Colorful Florida tree snails are extinct over thousands of acres in the Miami-Homestead area as the tangles of trees and vines were replaced by houses. Resorts and retirement houses fill the Florida Keys and more snails are nearly lost. They are gone from their original home, but survivors have been transplanted into the Everglades National Park by a few dedicated naturalists. So some were saved.

Even land snails have a few partisans. And I plead guilty to a somewhat malacocentric outlook. But many, many species are on the verge of extinction. There are only a handful of malacologists. Should the few of us collect and preserve samples from populations of the vanishing species? If we do this, there will be a bottled remnant in museum jars for our successors to study. But if we scramble to snatch these samples of vanishing forms, there is not enough time for study of what we get, nor for attempts to save and preserve. If we study some, then many will be lost without a trace. If we try to save a few, then neither collection nor study is possible.

No choice is easy. The island snails that I now study are vanishing rapidly. Saving them is not possible. Introductions of domestic animals, plants, and insects have set in motion habitat changes that doom the snails to extinction. Unlimited money, help and cooperation would not be sufficient to reverse the trends. So I collect and I study. When I can, I help efforts to save natural areas and preserve endangered species. This still is little compared with the need.

"Can man survive?" is the question now raised. Environmental catastrophies are predicted and occur. Crash programs on ecology will be called for and organized. The call of "relevance" in teaching and social work is being extended to science and research. The need for practical results to aid man's survival reduces the funds for basic research in the middle of inflation. Our awareness of dependence on other life forms ironically is breeding a new round of anthropocentrism. Will there be room on earth for insects and snails? Will there be room for students of them? ■



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... the anthropocentric staffing of Field Museum ...

Group of species	No. of species in each group	No. of curators working on these species	No. of species each curator "manages"
Man	1	7	0.14
Mammals	4,190	2	2,085
Birds	8,590	3	2,863
Reptiles			
Amphibians	8,500	2	4,250
Fishes	40,000	1	40,000
Lower Invertebrates	175,000	1	175,000
Land Arthropods	910,000	2	455,000

If Field Museum decided to have as intensive study of land arthropods as we do of mammals, we would need 436 curators for land arthropods. Actually, only about 50%

of the insect, mite and spider species are known, while nearly all mammals have been described. A more realistic need would be for 872 curators for land arthropods.





Solem, Alan. 1970. "Extinction Strikes 10,000 Species, Man Remains Unconcerned." *Bulletin* 41(4), 4–6.

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