



Creating the Nation's first BioPark

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Letter from the Desk of David Challinor
December 1991

In November I spent five days on Oahu, the most densely populated of the eight major Hawaiian islands, which are represented on the state flag by eight horizontal red, white and blue stripes. This was a business trip on behalf of the Nitrogen Fixing Tree Association (NFTA), which is headquartered on Oahu, but also maintains tree plantations on Molokai and Maui. In a subsequent letter, I will describe how nitrogen fixing trees can improve soil and furnish food, fodder and fuel for farmers in the Third World. This letter will discuss how the flora and fauna of Oahu and its neighboring islands have changed since the arrival of the first humans from Polynesia about a millenia ago.

The Hawaiian Islands rose from the sea bottom along an 1,800 mile rift in the ocean floor where two of the earth's large crustal plates converge. Geologists estimate that volcanic action allowed dry land to break the surface of the ocean about 100 million years ago. The first islands so created were completely inorganic when they emerged; however, not long after the lava cooled and stabilized, sea birds arrived at the newly created islands. Some must have brought plant seeds attached to their plumage or feet; other seeds were blown by the prevailing easterly winds from the mainland. Over hundreds of thousands of years, vegetation became established on the rich volcanic soil in sufficient quantity to support land birds which had strayed to these islands. Even enough bats eventually arrived to establish themselves. Thus before humans inhabited the islands, all the flora and fauna (birds and bats) had arrived there independently of man, and over millions of years evolved to exploit the climate and physical features of this new land. There they survived in what must have been a precarious balance between a benign climate and the violence of periodic volcanic eruptions which wiped out life over huge areas of land.

With the arrival of the Polynesians, the native plants and animals suddenly had to compete with new organisms brought by humans. Relatively few native species were able to compete successfully, as confirmed by research conducted by Smithsonian scientist Storrs Olson on fossil bird material found in Hawaiian caves. Olson found that at least 50 species, or as many as half the total number of original endemics, were extirpated prior to the arrival of the Europeans in the XVIII century.



1889-1989

"...for the advancement of science and
the education and recreation of the people."

Especially since World War II, the influx of people and the exotic birds and mammals they have introduced to the islands has changed not only the landscape, but also the composition of the flora and fauna, and altered it even more drastically than did the Polynesians. For example, today on Oahu it would be extremely rare to see any native lowland bird; they have been displaced by a dozen or more introduced species from around the tropical world, such as Brazilian cardinals, Indian mynas, Asian ground doves, and Java sparrows. Originally a bat was the only prehuman mammal; now feral pigs and goats, chital deer from India, and Asian mongooses are common on many islands.

Despite the efforts of state and federal wildlife departments to designate additional prime habitats for Hawaiian endangered species, some species may already be so low in number that they are doomed to extinction; for example, there are less than 20 'alala or Hawaiian crow left in the wild (ten are in captivity). I do not wish to imply that we should stop trying to save these endangered birds and plants, because there is always the possibility that if they can survive as a species long enough, a gene which would allow them to thrive in man's presence might become dominant. Such an example is the amakihi (a small perching bird), which seems to be expanding its range on Oahu and Hawaii into the lowlands.

One example of a bird exploiting a relatively recent alteration of Oahu's landscape is the wintering population of Golden plovers. This delicately proportioned, pigeon-sized plover breeds on the Arctic tundra and winters on Pacific islands. They were not common on Oahu during the war, as I found while spending time, albeit limited, bird watching. Today, however, these plovers are plentiful, particularly on golf courses. Clearly, many factors are involved in determining population growth in a species, but it appears that the postwar increase in golf courses, lawns and pastures on Oahu provided ideal new habitats for this species. Also, the better the condition of the breeding birds when they arrive at their nesting sites, the better their chances of raising successful broods during the short Arctic summer. I checked the Hawaiian Audubon Society's journal, Elepaio, for Christmas bird count totals for the Golden plover. Every year throughout the country, around Christmastime, local Audubon Societies designate one day in which teams count every bird seen from midnight to midnight. Thus, over the years, we have learned how bird species are doing. Elepaio reported an average 24 hour count of Golden plovers:

1950's -	220
1960's -	530
1970's -	1300
1980's -	>1700



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Even though there were probably more people counting in later years than in the 1950's, the evidence supports the conclusion that there now are significantly more wintering Golden plovers on Oahu than existed 40 years ago.

Rapid landscape changes have their costs, and these are particularly noticeable on the restricted land area of the Hawaiian Islands. The Golden plovers have done well, but myriad other native plants and nonmigratory birds could not adapt and have become extinct. Competition with humans will only increase as more people occupy the landscape. Nonetheless, we all have a great responsibility to slow extinction rates, for we cannot afford to lose variety.

I would hate to think of future wildlife populations consisting only of those animals that have adapted so well to the human-dominated landscape that they have become not only nuisances, but actual threats to human health. Examples abound of rabies carried by suburban foxes and raccoons, Lyme disease with White-tail deer as a major vector, or the nuisance on suburban lawns and golf courses of nonmigrating Canada geese. Ominously, some Hawaiian Golden plovers have stopped migrating north to breed! Might this beautiful bird also become a nuisance or even a threat to human health? Clearly this conflict between man and beast will continue, and beautiful islands such as the Hawaiians can prepare us for what we will have to cope with elsewhere.

Michael Robinson tells me that Hawaii is perhaps more interesting for what has happened in invertebrate evolution than in the bird world. In the absence of ants on the islands -- a dominant tropical group -- other kinds of insects have evolved to fill some of the ant niches as predators of other insects. For example, there are fly larvae that catch and eat other insects -- an amazing adaptation. Mike has agreed to be a "guest letter writer" at a later date and will inform us more fully of this interesting facet of life on the Hawaiian Islands.

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