Geographical Variation in the Scarlet Macaw

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The geography of the Americas is similar to the form of an hourglass. The uppermost bulbous end is composed of Mexico, the United States and Canada. The lower portion is South America. Joining these two is the narrowing neck of Central America.

Inverting an hourglass enables gravity to pull sand through the constricting collar and likewise there are natural pressures that would move animals and plants past the Isthmus of Panama. Obviously, birds will have a greater facility to transfer up or down than mammals. Migratory species sweep through Panama twice in a year. However, those with less well developed powers of flight, or those specialized for a particular habitat or diet, would find it more difficult. Some species have found it impossible to shift through Central America. Cranes and chickadees have still not entered the southern continent, whereas a few species of tinamous, cracids, hummingbirds, toucans, antbirds and cotingas have progressed past Panama in the opposite direction. This is certainly true for parrots.

If we think of the nectar-feeding lories; the nocturnal, grazing Kakapo; the inner-bark eating pygmy parrots; the broadtails and cockatoos of the Australian region and then compare these with the parrots from the Americas, the first group seems to have a far more obvious complexity. There may be several reasons for this. Isolation on islands is notorious, in the evolutionary sense, for rapid speciation. Another is that all of this area has suffered repeatedly from climatic change, and with this the changing vegetational patterns with each event would thrust the parrots into another evolutionary maelstrom. Perhaps, therefore, this rich, antipodean variety has taken a comparatively short geological time to accomplish. The "age" and history of parrot development is another story.

Nevertheless, the overall sameness of the New World forms suggests that they are relatively recent in a geological sense. This is but one reason why I am convinced that they immigrated there somewhere between fifteen and ten million years ago.

The world's climate was then warmer than it is today and the hardy trees such as pine, alder, and birch, and cold-resistant herbs and grasses grew to the extreme north. It was not just parrots but many animals, including such cumbersome creatures as the elephants, that crossed from Asia, over the Bering Straits, to become the first representatives of their kind in North America. Precisely as did the Asiatic people, some 45,000 years ago, the limited number of pioneering parrots who gained entry into such a fertile land would have rapidly spread their multiplying populations as far south as Terra del Fuego.

In the absence of competitors for hard-shelled seeds, in a "double continent" providing so very many different habitats, vegetation and climates, the parrots would have experienced exactly the circumstances to give them a comparatively rapid speciation. Ultimately, this gave us the modern American species as is found today.

Long after the time of their entry, the several ferociously protracted Ice Ages must have wiped the "slate" of most of North America completely clear of parrots. As each cold spell ended, the intervening warm respites allowed parrots to expand upward and outward from the tropics. The dry deserts of northern Mexico and California were barriers and this made it difficult for the parrots to get into the States. Nevertheless, the Carolina Conure *(Aratinga carolinensis)* (it may have got in via Florida) established itself as far north as the state of New York. A few conures, some Amazons and the Thick-billed Parrot *(Rhynchopsitta pachyrhyncha)* came to inhabit Mexico and northern Central America. (The Thick-bill may, today, be not too dissimilar from its Asiatic "ancestors").

Some macaws were able to move northwards out of South America. Of those that did, the Green-winged *(A. chloroptera)* and Severe Macaws *(A. severa)* became stuck at Panama. Two species, the Military *(A. militaris)* and Scarlet Macaws *(A. macao)*, managed to get through. Once there, they had no competition from other macaws and could evolve into their "niches." Coming from the mountain slopes and moving into the humid tropical lowlands isolated some Mili-

tary Macaws. This ecological difference enabled them to evolve larger size, paler color, and now a different pattern of behavior. This went to such an extreme that they became a different species: Buffon's Macaw *(A. ambigua)*. Elsewhere, the Military Macaw also became somewhat less montane and has now diffused over much of Mexico. These now differ subspecifically from those to the south.

Likewise, the Scarlet Macaw of Mexico and Central America may also have gained entry only towards the end of the last Ice Age (some 12,000 years back). Originally, so few individual birds percolated through the constraints of the Isthmus that they were limited in their genetic diversity. Once through this geographical barrier, the inevitable inbreeding and subsequent evolution from the founder-immigrants ensured that they developed a different appearance from those Scarlet Macaws found on the mainland of South America.

The museum worker is very much inclined to subdivide species of birds into geographical races (or subspecies). The usual reasons are that they have differences in coloration or size. It is strange that no one has subdivided the Scarlet Macaw.

While in Washington, D.C. for the 1990 AFA Conference, I went to further confirm this in the ornithological section of the Smithsonian. At once, I found that Joanne Abramson (of Raintree Macaws) had independently come to the same conclusion, for she was there carefully working through their skins.

We agree that the Scarlet Macaw has two discernable populations. One, to the north of Panama, tends to have a paler red feathering. Perhaps this race is more subject to fading, especially to the nape of the neck. However, the chief characteristic of this form is the yellow of the wing coverts. This is fairly extensive and has no, or very little, green edging to these golden feathers. In South America, the macaws tend to be a darker (and more sun-fast?) red in color. Some individuals almost approach (even if it is never as rich) the sombre, darker, scarlet red coloration of the Green-winged Macaw. The southern population also tends to have much less yellow to the wings. In some Scarlet Macaws, this is of a brighter, richer gold. In others, it has a faint red suffusion to it. The major difference with all of these birds is that a number of the yellow feathers are richly tipped with green. Indeed, some of the coverts may be entirely green. Further, though this has yet to be corroborated by the measurements taken of museum skins, so many of the aviary birds obtained from South America (some are known to have been imported from Guyana) seem so much larger generally (as well as being brighter) than those known to come from northern Central America.

The Scarlet Macaws from Panama, and to an increasingly lesser degree Costa Rica, have examples of both colorations in the population. It is, therefore, assumed that this area forms a "hybrid zone" between the brighter southern and the duller northern races.

It would take a study which encompasses more skins than the British Museum, the Smithsonian, and the American Museum of Natural History have supplied, to prove that geographical patterns are present in even smaller geographical areas. For example, I know that some of the most brightly colored Scarlet Macaws from Nicaragua, to the northeast of Panama, have blue tips to many of their yellow feathers. Skins from some areas prove smaller. In Brazil there is a difference, or appears to be, between those birds found in the southeast and northwest portions. Perhaps some of these differences will prove to be nothing more than a "cline" where one form gradually merges into another. This is yet to be studied.

We might mention that both the Military and the Scarlet Macaws crowned their pre-Cortez conquest of Central America by getting into the largest of the Caribbean Islands. Unfortunately, the macaws from these are now totally exterminated and as most went in the years before descriptive ornithology began, we have so little to go on. A few entries have come from buccaneers' log books, from ecclesiastics' diaries and from sporting (gun-toting) land owners. Although many species have been suggested, it does seem that there were but two on the Greater Antilles. The better known, and only because it survived longer, is the Cuban Macaw *(A. tricolor)*. This smallish macaw was obviously derived from the Scarlet Macaw. The green one from Jamaica *(A. erythrocephala)* seems to have descended from the Military Macaw. ●

The Macaw Society of America

by Robert Francis
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The Macaw Society of America (MSA) was formed in the middle of 1990. This national organization was founded to promote the continued education of all its members, breeders, owners or others interested in the care, breeding, ownership and preservation of all macaw species. Its purpose is also to continue to promote the domestic breeding of the endangered species while discouraging the practice of hybridization of all species. It promotes the restriction of importation of macaws, limited to breeders for the establishment of new gene pools for the domestic pet trade, thereby reducing the pressures on the limited populations in their native lands.

The Macaw Society of America publishes a bi-monthly newsletter which provides the information about macaws or macaw-related items. This newsletter includes input from various avian experts, breeders, owners and veterinarians. Through its newsletter, it is the objective of MSA to provide all the latest information on the developments in the areas of avian research along with providing updates on current illnesses and diseases affecting macaws.

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