

## CONSERVATION

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# A Survey of Costa Rican Birds

*Inside and Out*

BY DOUGLAS CAUSEY

**P**UT DOWN YOUR WEAPONS AND DON'T move!"

From the dense vegetation of the Costa Rican forest, five men dressed in camouflage uniforms and armed with carbines burst into view and ran across the road.

"Don't move! We'll be back to pick you up," the team leader shouted to us. As quickly as they emerged, they vanished into the underbrush bordering the Río Cua-jiniquil, a small stream running northwest through Costa Rica's Parque Nacional de Santa Rosa near the Nicaraguan border. Jeremiah Trimble, Curatorial Assistant in the Bird Department at Harvard's Museum of Comparative Zoology, and I dropped our shotguns and well, we didn't move. I was aghast. We had just begun working in Costa Rica, at the Área de Conservación, Guan-

caste (ACG), a complex of three national parks and associated reserves and protected areas under the administration of the country's Ministerio del Ambiente y Energía. Under arrest by the authorities was not how I intended to start this project. We had come to the ACG in June 2001, at the invitation of Señor Róger Blanco, ACG Director of Scientific Research, to participate in a project designed to survey the parasites of all of the vertebrate animals found within the conservation area's boundaries. In addition to administering Costa Rican national parks, the ACG and the other ten Áreas de Conservación in Costa Rica serve as the centers for research, public education, and conservation of the country's biodiversity. In a long-standing tradition here, documenting and cataloging the complexity of the natural world is equally important as research

designed to understand the patterns and processes of biodiversity. So is work to conserve and protect the natural habitats. Daniel Brooks, University of Toronto, had begun an inventory of the parasitic organisms associated with vertebrate animals. However, he had not fully attempted the most difficult group—birds. They are by far more numerous than fish, reptiles, and mammals here, and they are difficult to capture. This is where I came into the picture. Dan and I have worked together for several decades—even co-authoring a book together. My current research emphasis on viral diseases in wild birds made it easy for me to accept the invitation to participate in the parasite inventory. Several avian viruses have become more prominent in public awareness than many others have in the past, in particular, West Nile Disease



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Virus and Influenza. These diseases are known as zoonotics, ones that originate in animals and “jump” to humans. (SARS is another zoonotic disease, for example, but it is thought to have originated in small Chinese carnivores, Palm Civets, rather than in birds.) What interests me particularly about avian zoonotic disease is understanding the evolution and ecology of virus-animal systems. I seek to discover how different types or viral strains have evolved with different host species of birds, and what role the environment—where the birds and virus live—has in generating new strains, and new combinations of viruses and susceptible hosts. In order to get the basic informa-

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tion about which strain and type of virus is found with which species of bird, and where and when, we catch birds and from them collect samples of body fluids that we later analyze in the laboratory. Some of our target viruses, such as Newcastle Disease Virus, are known already to occur in rainforest birds. This virus usually causes low-grade symptoms in infected birds, but under certain circumstances, the virus can mutate into a very virulent form and kill thousands of wild birds. When it jumps to domesticated birds, such as chickens and other poultry, the results can be economically devastating. We are screening for other viruses not currently known to occur in resident birds, such as West Nile Virus, but which are found in migratory species and thus inevitably are a threat to wildlife in Costa Rica and the rest of Latin

America. Emerging infectious diseases will have the most serious consequences in small isolated populations, and species with no history of infection. Many of the charismatic birds of Central and South America like the Quetzal, toucans, and parrots, fall into this category and are potentially very susceptible to diseases of this kind.

We usually catch birds with mist nets that are finely woven of very thin, nearly invisible nylon threads—once we even captured two Austrian entomologists who walked into our nets while looking for ground beetles. The nets, however, work well for only the small proportion of forest birds that forage within about two meters of the ground. The residents of the middle and upper canopy of the rainforest and high-flying birds—more than half of the total—are completely missed. We

had an additional problem as well. Most of the parasitic worms found in birds can only be recovered by dissection of a killed bird. That meant that we needed to collect birds with shotguns in addition to using nets. (All of the birds that were dissected by the parasitologists were made into scientific specimens that are now held in the Museum of Comparative Zoology at Harvard or in Costa Rica.)

“Have you seen anyone else? Who is firing at our wildlife? Who are you?”

The leader of the armed band of “guerillas” had returned with his men, and it was clear from their muddy uniforms and rapidly developing welts that they had not found it easy going through the underbrush.

“We are scientists working on birds...” As I started to explain what we were doing, I noticed that he was wearing an ACG insignia and had information brochures about the park in his shirt pocket. These were the park guards, not the National Police.

Alas, the memos describing our activities were still buried on someone’s desk; the park guards had spent the morning patrolling the park borders looking for poachers



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and illegal fires. As a result, they’d missed the radio announcement of our activities; and I had neglected the basic courtesy of speaking with the people responsible for protection of the park before we started our work. Their relief in learning that we were

neither drug or weapons smugglers, nor adventurous but misguided tourists, was tempered by their unnecessary early morning jog through the Tropical Dry Forest. They would go to any lengths to protect the integrity of the national park, but false

## BIRDING ON THE EDGE OF THE WORLD

The dirt road crossed the pass at about 15,000 feet and entered a wide treeless valley, without any sign of human presence. Flanked by jagged hills, the valley spread below the peaks of snow-capped mountains. Vegetation was sparse, rocks scattered everywhere. Patches of snow clung to the shady sides of the clumpy ichu grass. In this high puna area of the Peruvian sierra, we had come as birders, riding in a rattletrap Dodge van, searching for some of the world’s rarest birds in an area that seemed at the limit of survival possibility for any species of the animal kingdom.

Our objectives were the White-Bellied Cinclodes and the Diademed Sandpiper-Plover, both species resident only in high alpine bogs of the Andes. Found only in a few locations in central Peru, the Cinclodes is considered by one Lima-based ornithologist to have a surviving population of fewer than 30 individuals. Nevertheless, the Diademed Sandpiper-Plover, although more widely distributed from central Peru to southern Chile, has been described as “almost mythical.” The Cinclodes, a Peruvian endemic, i.e., a bird found in only one country, is one of 118 endemic species in Peru. Of all the countries in the world, only Brazil has more. By contrast, there are only six endemic bird species in the continental United States. The total number of bird species in Peru is approximately 1800, a figure exceeded only by Colombia among the world’s nations. Such numbers are constantly growing, however,

because new species are still being discovered.

This remarkable species diversity makes the mountains and jungles of South America a paradise for birders. Unfortunately, many of these species are confined to impossibly small areas, struggling against the imminence of extinction. Among the species on evolution’s chopping block are the two target birds that we sought.

In pursuit of these and other Andean birds, we were an expedition of four: driver, birding guide, and two paying customers, who had been charged the princely sum of \$80 apiece for a two-day trip, up from Lima on Saturday, back on Sunday, food and hotel included. We could hardly complain that the accommodations were primitive. They were, after all, the best that the town of San Pedro de Casta had had to offer. Moreover, our birding guide, Gregorio (Goyo) Ferro was competent and relentless in his search for target birds.

The road continued down a gentle slope, the valley floor being nearly as high as the pass we had crossed. The vegetation changed substantially as we descended, the scattered ichu at the pass giving way to a thick green carpet. It looked like a broad rich pasture, but when we stopped and walked about it turned out to be spongy underfoot. This was one of the Andean bogs that was home to our target birds. There were no trees, no bushes, just the green carpet stretching outward from rock ledges on the valley’s sides.



alarms caused by inconsiderate gringo *científicos* strained the limits of hospitality. After this, I notified the guards before we set out, and we avoided armed confrontations.

The success of Costa Rica's national park system is strengthened by the dedication and passion of the people who work there: the guards that protect the plant and animal life, the educators who teach local people about the natural history and biodiversity of their environment, and the technicians who assist in research activities like ours. The latter group are called parataxonomists, who are people recruited from nearby rural areas and who have been highly trained in scientific collecting, basic taxonomy, and specific research techniques. Much of the fieldwork and specimen collection associated with Costa Rica's national biodiversity inventory conducted by the Instituto Nacional de Biodiversidad (INBio) is done by parataxonomists. We were quite fortunate in having three very skilled parataxonomists working with us, Calixto Moraga, Petrona Rios, and Elda Araya. But our project presented some issues they had not experienced before, and one that I hadn't anticipated.

"Which word do you want me to use?"

*Guano* or...?" Calixto asked me as he was entering data into the computerized database on parasites and hosts maintained by Dan Brooks (<http://brooksweb.zoo.utoronto.ca/index.html>). "There are many words to use, but what is the most appropriate for science?" he said, "Many people will be interested in our results and it is important to use the correct term, particularly for a word like this."

I agreed but had no answer. I also knew many synonyms of this word in Spanish, but most (all in my case) are not suitable for a scientific publication or this magazine. This was a problem of many dimensions. What goes into a bird from the front comes out of the bird in the rear, and it serves as convenient medium for detection of viruses, bacteria, eggs of parasitic worms, and the other subjects of our inventory. It also is a source of infectious disease carried by birds, and thus can be a concern for public health and domestic agriculture. Our inventory of avian parasites was useful at several levels, not only as an academic survey of biodiversity, but also as a tool for medical and veterinary science. Petrona and Elda supplied the term ("*heces*") and observed that

men are often useless in matters subtle and delicate.

With the help of the parataxonomists, volunteers, and students, we have documented more than 450 species of birds in northwestern Costa Rica, which is equivalent to the number of species breeding north of Mexico. From these, we have recovered thousands of species of parasites, most of which are unknown to science. As our knowledge of the diversity and complexity of life in tropical regions increases, and we know more about the members of the hidden world of parasitic organisms, we become better prepared in understanding the strength and fragility of our natural world. Empowering local people in gathering and interpreting this knowledge, as we are fortunately able to do at the ACG, facilitates this work and raises the environmental literacy of those most greatly affected by the state of the environment.

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Goyo and Juvenal, the driver, set off in different directions, in search of the birds. I was not feeling peppy in the high altitude, so I stayed close to the van and occupied myself with birds that were more common but still new to me: an Andean Flicker with his raucous call, various Plain-Capped Ground-Tyrants, a pair of Andean Geese.

Goyo and Juvenal returned. No luck. It was getting late in the day, and menacing clouds had been rolling in, putting an end to the day's sunshine. We two customers were satisfied with the trip and ready to call it quits. Earlier we had seen other marvelous Peruvian endemics: a Great Inca-Finch, a Black-Necked Flicker, a rare and improbable White-Cheeked Cotinga. Goyo however didn't want to give up. We got into the van and found a side road that went over a low ridge and down into a lower valley bottom. Again we spread out and walked across a treeless plain: no luck again. We did see a pair of Gray-Breasted Seedsnipes, which I thought pretty exciting, but no Cinclodes. And no Diademed Sandpiper-Plover. We returned to the main road in the valley and headed for Casapalca and the highway back to Lima.

Still Goyo was not finished. A couple of miles down the valley, over another low ridge and to a lower valley floor, Juvenal pulled the van off the road and once again we set off across a spongy green carpet, jumping from tuft to tuft to keep our feet dry. The clouds were very dark now, and thunder clapped loud and close. I noted that we were in the center of a flat valley with no nearby high points that might divert a lightning strike. I was, however,

consoled to see that this valley was relatively small, the peaks close and very high above us.

Goyo saw it first, perhaps 100 yards ahead, moving past the tufts of grass, then motionless. We got the scope on it. It was an adult Diademed Sandpiper-Plover with its dark head giving emphasis to the white line just above eye level that extended completely around its head. It behaved like a Killdeer, its abundant North American relative, standing perfectly still for extended periods and then moving very fast to another point of standing still.

Goyo spotted another bird, sitting on a rock just ahead of us. A hummingbird? Indeed it was, although there wasn't a flower within miles. It was an Olivaceous Thornbill, and so tame that Goyo got to within 6 feet with his camera snapping away before the bird flew.

Goyo still wasn't done. We continued on. Seeing movement along a fence line some 200 yards in front of us, we aimed the telescope toward it. It was a White-Bellied Cinclodes, unmistakable because of its size and the whiteness of its breast and belly. We all got good looks at this rarest of birds. Goyo asked if we wanted to move in for a closer look but we respectfully declined. We were content. All the birds targeted for the trip had been spotted. As we made our way across the bog back to the van, hailstones started to fall on us.

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