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Reprint Mailing 124

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April 1993

"If there is something peculiar about us latter-day human beings, it is our ability to opt for destroying a resource essential for everyone's survival, rather than simply controlling a competitor's access to it. In this new game--untried in an evolutionary sense--neither the resident nor the intruder ultimately wins. As the resource vanishes, all potential users are inevitably vanquished."

-- Gary Paul Nabhan

This issue of the **Reprint Mailing** is devoted to the essay "Hummingbirds and Human Aggression: A View from the High Tanks" by Gary Paul Nabhan, ethnobotanist and conservationist, who works with indigenous desert plants and peoples in the US Southwest, Mexico and Australia. His essay collection **Gathering the Desert** won the John Burroughs Medal for nature writing in 1986 and in 1991 his work with seed preservation earned him the Premio Gaia, an international environmental award given by the government of Sicily. He is currently a MacArthur Fellow and a Pew Scholar, and is chairman of the board and research director of Native Seeds/SEARCH, 2509 N. Campbell Ave., Tucson, AZ 85719.

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Gary Paul Nabhan

Hummingbirds and Human Aggression: A View from the High Tanks

I

THIS is not exactly what I'd call a resort, nor have I come here for sport. Instead, I've pulled into a pit stop on the devil's highway, in February 1991, for a reckoning of sorts. I've come to see if anything grows in the tank tracks scarring the desert floor, to watch creatures battling for riches in patches along dry washes, and to reflect upon human aggression.

My camp in Arizona's Stinking Hot Desert is more than twenty-five miles away from the nearest permanent human habitation, but less than four from a stretch of international border. That stretch, among the hottest on earth, has pulled me into its camps six winters over the last sixteen. This year differs in a subtle manner; I feel a tension carried in the atmosphere which I have failed to observe before. I sense this weight in the air is somehow balanced by the war in Kuwait. I am not sure, however, whether I am the one bringing this tension along, or whether it is endemic to this land of little rain but remained hidden from me in the past.

The origins of this tension have become my consuming passion. Like a lab scientist peering through a microscope to identify some debilitating disease, I've fixed on a global issue through concentrating my attention on this desert microcosm. I hope to discover a morality that is not an abstraction, one that emerges out of the local ecology, and that I can adhere to in this place. This morality must address a fundamental issue: "Are human societies fatally stuck in a genetic script of aggression against one another, whether or not such behavior is now adaptive?"

With every step I take around camp, I seek clues. I find myself kicking up bones, grave markers, ammunition shells, historic warheads, and

missile debris. At night, I glimpse vapor trails of various nomadic tribes, coming in for a little water; the cliffs echo with the calls of owls, these hooting souls reminding me of their presence.

Maybe I can echo-locate myself for you. I'm below an ancient watering spot along the Camino del Diablo, where over four hundred deaths have been recorded during the last century and a half. Some of these wayfarers died of thirst, some from broken dreams, some from ambush. Here, it is not hard to imagine hunters in pursuit, and the hunted in hiding or in flight. Over millennia, various tribes have converged here as their migration routes intersected. They bartered, haggled, or battled over scarce resources, and they shifted the boundary lines of their territories. My camp below High Tanks is loaded with the dispirited bodies of these past encounters, for the historic cemetery and much of the prehistoric archaeology once evident here have been bulldozed and tank-trampled by more recent military maneuvers.

I should explain, by the way, that I speak of two sorts of tanks. The latter are those of the US Marines, armed and armored all-terrain vehicles. The former, the High Tanks, are usually called *Tinajas Altas*, as they were named in Spanish prior to the battle of the Alamo, when they were still part of Mexico. The High Tanks form a series of nine plunge pools, waterholes no bigger than bathtubs, naturally carved into the bedrock of a shady drainage that cascades five hundred feet down an abrupt granitic ridge.

Such cascades are seldom covered by waterfalls here in southwestern Arizona, where precipitation is so variable from year to year that all averages and ranges have lost their currency. Rain may fail twenty-six months at a time, but bombs fall out of the sky quite frequently, because the tanks lie in a bombing range jointly administered by the Marine Corps Air Station in Yuma and a Bureau of Land Management office in more distant Phoenix. The area is often closed to "public access" during periods of bombing exercises, tank maneuvers, and mock battles. Here, in the late 1970's, the US military reputedly prepared for the ill-fated helicopter raid into Iran's arid turf to free American hostages, and more recently it prepped for Operation Desert Storm.

I ponder that operation and my own genetic history as an Arab-American. A week before missiles were exchanged across the Saudi Arabia–Kuwait border, a Middle Eastern geographer sent me a few pages from Sir Arnold Wilson's 1928 history, *The Persian Gulf*. I was simultaneously intrigued and appalled to read how, eleven centuries ago,

a state of anarchy prevailed from Oman to Basra. Taking advantage of the general chaos, Muhammad bin Nur wrested control of the region: "He cut off the hands and ears, and scooped out the eyes of the nobles, inflicted unheard-of outrages upon the inhabitants, destroyed the water-courses, burnt the books, and utterly destroyed the country." Nur's tyranny was met with "the vengeance of an infuriated people," who disposed of his deputies but then went through seven Imams of their own in less than thirty years. The area continued to be fraught with "intestine quarrels," Wilson tells us; then, "about the middle of the twelfth century, the Nabhan tribe acquired the ascendancy and ruled over the greater part of the interior of the country until the reestablishment of the Imamate in A.D. 1429; this tribe, however, continued to exercise considerable influence for quite two centuries longer . . . until . . . finally suppressed."[1]

Stunned, I learned how my own Nabhan kinsmen fought off Persian invaders, skirmished with a petty sheik from Hormuz, and then dealt with the dread Mongols who, at one time, held nearly all of Asia Minor. During this epoch, a few lasting monuments were introduced: underground *qanat* waterwork technologies, stone dams, arid-adapted crops, and Persian-influenced temples. To be sure, the long chronicle of bloodletting, upheaval, and desert destruction dwarfs these material accomplishments. My paternal ancestors had no doubt been as absorbed in the warring, the warding of territory, and the hoarding of resources as any of them. Do genes for pugnaciousness lie latent within me? How much of the same bellicosity can be found in the history of Everyman?

I ask these questions to the desert, not rhetorically but literally: to the desert that is an open book waiting to be read, the desert that so casually pulls up its shirt, like Lyndon Johnson, to show us its scars. And I ask these questions to the Sonoran Desert in particular—but because the Sonoran is hitched to every other desert in some essential way, the answer I hear has bearing on the Persian Gulf.

II

The sound of divebombing jars me from my slumber. Some hummingbirds call this place home, others migrate through it, but they all fight tenaciously for its resources. I hear metallic shrieks and *zings*—the latter not unlike the sound of glancing bullets—as they dive or chase one

[1] London: George Allen and Unwin, pp. 82–83.

another. I try to roll over and cover my ears, but the high-pitched chittering has penetrated the tent walls. I must get up, go out, and face the music.

The morning sun has not yet come over the Cabeza Prieta range across the valley from us, but the fighting began well before daylight. I am camped in a wash that is a haven for hummingbirds, but to arrive here they crossed a veritable hell, virtually devoid of the nectar and insect foods which their hyperactive metabolisms require. For miles in any direction, the surrounding desert flats and rocky slopes have little to offer the migrants of late winter. However, along a couple hundred yards of superficially dry watercourse leading down from the tinajas into the desert valley, the shrubbery is unusually dense. The native bushes form nearly impenetrable hedges of foliage along the banks of the wash, and some of these verdant walls look, at first glance, to be splattered with blood. But the color in fact is supplied by thousands of crimson, floral tubes of *chuparosa* for which the shining warriors battle.

Chuparosa simply means "rose-sucker" or "hummingbird" in Spanish. I am speaking of flowers so custom-fit for pollination by hummingbirds that they bear the bird's name wherever they grow. The chuparosa flower is elongate for hummingbird bills and tongues, a chalice filled to the brim with nectar each dawn. The bushes bloom through late winter in frost-free zones, tiding the birds over until the coming of spring stimulates other plants to blossom. Their bright color can attract hummingbirds from some distance away. In turn, the winged creatures transport the "sperm of floral sex" from one bush to the next, ensuring cross-pollination. The birds' iridescent heads become discolored by the thousands of pollen grains plastered onto them as they probe the flowers, hovering at their entranceways.

As I marvel over the perfect fit between hummer and blossom, another hummer comes along—and a high-speed chase begins. The Rufous Hummingbird and Costa's Hummingbird dogfight over the flower that is seemingly suited to fit both their needs, while I wonder how their belligerence is viewed by the Bambi Bunch, those who see all animals as cute, cuddly, or constantly in balance and at peace. In the blazing sun of a Tinajas Altas morning, I take a hard look at the desert, its creatures and flowers, trying to keep my own rose-colored glasses from tainting the picture, from stereotyping as nature films and glossy magazine features so often do. I concede that Nature behaves unlike model members of either the Tooth-and-Claw Hunting Club or the Benevolent Sorority

of Nurturing Networkers. Nature, to my knowledge, has not recognized that adherence to any anthropomorphic construct is a requisite for existence. I try to put such filters aside, wanting to read the desert's own patterning without superimposing others upon it.

So I walk up and down the wash looking for hummingbirds, soon catching a flurry of avian activity in a dense patch of chuparosa bushes. I go and sit upslope between two battlefields, and not far away from a third chuparosa. At one, a male Costa's is perching on a mesquite branch overlooking a mound of flowers. He darts out to hover in front of a blossom or two and sucks up their nectar. Then, he suddenly turns to chase away another small bird. I watch as he whips away after another Costa's male or possibly a Black-chinned. Minutes later, he chases an Anna's that ventures too close to his treasure. Although Costa's adults are somewhat smaller than these other species, they are roughriders, well adapted to such desert conditions. It is not surprising that they are the most abundant warriors in this wash.

I guess they must already be nesting and mating here. Down the wash a little way, I spot the purple throat (characteristic of Costa's) on a bizarre dancer; he is flying a huge U-shape, an arc perhaps sixty to eighty feet from tip to tip. He hovers at the end of the arc, high up, then swoops down to the ground with a high-pitched buzz; soon, he begins again, tracing the same arching pathway. From my vantage point, I can't see a female at the base of his courtship loop, but suspect that this aerial ballet is not being done to flatter *me*.

In the next patch over, I'm having trouble telling who has been holding the territory most of the time. Whenever I can identify the actors in a Painted Desert drama, a Rufous male has the upper hand over a Costa's.

Rufous Hummingbirds do not nest here; they migrate up through California when the ocotillo blooming begins, and some continue as far as Alaska. The wandlike ocotillos are spread widely over the rocky ridges and flats of the Sonoran and Mojave deserts. Their populations burst from bud sequentially—south to north—providing migrants with a bridge extending northward. Sometimes, when cold winter weather has postponed ocotillo flowering several weeks, the hummers try to migrate anyway—in advance of peak flowering. Ocotillo fruit in these years are left with low reproductive success when their pollinators miss their date.

The ocotillo-flowering fest is an event that will begin here in another week or so. In most years, I recall, migrants such as Rufous arrive in late

February just prior to the opening. They pack into the chuparosa patches already occupied by Costa's and Anna's, adding to the territorial tension. Physiologist William Calder, who discovered a remarkable lifelong fidelity of hummingbirds to their nesting sites, has also observed Rufous individuals allegiant to particular stops along their normal migration route. Even though Rufous do not nest at Tinajas Altas as do Costa's and Anna's, their stake in this place is more than a one-shot deal. Unlike certain birds that become territorial only around courtship, breeding, and nesting, Rufous Hummingbirds even lay claim to sets of resources en route to their breeding ground. Accordingly, they fight tenaciously to keep other hummers out in the cold.[2]

This fact struck me as curious, for I had supposed that birds become territorial only when needing to exclude other males of their own species from access to potential mates, or to guard enough food to raise a brood. Melees between migrants didn't make sense at first. I wove my way down the wash, wondering about this seeming incongruity. I then recalled that a mentor of mine, avian biologist David Lyon—who had introduced me to the subversive science of ecology two decades before—probed this very problem three hundred miles to the east of Tinajas Altas, in the Chiricahuas.[3]

When I contacted Lyon later on, he responded to my questions on hummingbird behavior with the fine particularism that characterizes the best of ecologists: "Where *were* you?" he asked. "There are great differences in territoriality in the winter depending upon the area. But all of these little rascals are opportunistic and will set up territories any time of the year if rewards are sufficient."

If rewards are sufficient. Lyon views the driving force of hummingbird territoriality as the defense of dense caches of food during times of the year when there are few alternative energy resources. Because hummers must consume close to half their weight in sugar each day to maintain normal activities, finding a concentrated source of food for their fifty to sixty meals per day is a palpable problem. Territories at the Tinajas, then, should be most pronounced when chuparosa nectar production is sufficiently high to make the exclusion of other birds worth the price of the energy expended in defense. Imagine a chuparosa patch

[2] William A. Calder, III, et al., "Site-fidelity, longevity, and population dynamics of Broad-Tailed Hummingbirds: a ten year study," *Oecologia* 56 (1983), 359.

[3] David L. Lyon, James Crandall, and Mark McCone, "A test of the adaptiveness of interspecific territoriality in the Blue-Throated Hummingbird," *The Auk* (July 1977), 448–49.

as an oil field thick with wells, in a country with few other energy resources developed. That's where the troops will hover.

I had a chance to explore Lyon's notion a month later when I returned to my camp, not long after the peak of ocotillo flowering on the surrounding flats. The wash so aggressively and noisily guarded in early March was as quiet as a reading room in April. There were still hummers around, but no frenzy of flowering attracted them as before. Most of the resident birds had dispersed after nesting to draw upon the widely scattered ocotillo blossoms that remained. The migrants had moved on, so the number of competitors for any single patch of flowers was low. Territorial shows, for the most part, were canceled.

Lyon himself had tied the story down another way. He verified that territoriality among different species of hummers was truly adaptive, and not simply a misdirected means of venting innate aggression on other species that a male has mistakenly identified as competing for his potential partners. For his test, Lyon enticed a Blue-throated Hummingbird to establish a territory in an area circumscribed by ten sugar-filled feeders, two placed in the center of the area and eight in a circle on the periphery. Over the following period, he held constant the amount of sucrose available to the bird, but once a day he moved the eight on the periphery farther out from the midpoint, enlarging the area over which the sugar sources were distributed.

Lyon was not surprised when the Blue-throated male took to chasing other hummers out of the artificial territory, regardless of the area it covered. In fact, this male at first spent twice as much time in dogfights around the hummingbird feeders as males typically spend defending natural patches of flowers. The trouble came as the feeders were spread over a larger area. The Blue-throated initially attempted to defend the expanded arena, but the number of competitors entering it increased to two-and-a-half times what they were in the original small territory. In the smaller arena, the territorial male chased after the majority of all hummers trespassing into his turf, irrespective of their species identity. When the sugar was set out over the largest area, he was forced to become more selective in his combat; he needed more time to pursue competitors across the longer distances between feeders, and more time flying to reach the various feeders to refuel himself.

The Blue-throated male shifted his strategy. Rather than wearing himself out with incessant jousting, he opted for adaptability. He had tolerated the presence of females of his kind all along, but now he also

permitted Black-chinneds to forage on the periphery. Although they outnumbered the other hummers at this time, Black-chinneds were small and therefore the easiest competitor to expel when resources became scarce. Magnificent Hummingbirds, another species slightly larger than Blue-throateds, posed more of a threat. And yet, by afternoon, most of the Magnificents in the oversized territory were tolerated as well.

At last, defense against all comers became tenuous. A few competing Blue-throated males were allowed to feed without being ejected. Still, whenever other Blue-throated males were chased, they were pursued a greater distance than that flown to repel other species. If another bird was seen as a competitor for *both* food and sex, the aggressive tendency of territorial males toward him remained in place.

Place per se is not what the birds are defending. They are after a finite amount of nectar, pollen, and bugs required to stay alive and to pass on their genes. If they can glean those foods without much territorial pyrotechnics, they will do so, whether from a small area or a large one.

Their lives cost something, as do ours. On a late winter day, an Anna's Hummingbird must spend one minute out of every nine feeding in order to fuel its metabolism. Its hovering and flying demand ten times the calories per ounce of flesh that people need when running at full clip. If you give a hummer a feeder full of "junk food," it will reduce its foraging effort to a tenth of what it would be otherwise. Nonetheless, a male does not fill up all this newly found "leisure time" with warfare. Even when you give him a territory literally dripping with sticky-sweet sucrose water, his foraging efficiency increases tenfold while his time pestering intruders only doubles.

Put in terms of an ecological maxim, a male hummer will defend a patch of riches only to the extent that it is truly "adaptive" to do so. When battling becomes too costly relative to the food security it brings, he will relax what many observers have assumed to be unrelenting, genetically determined hostility. Here is where the genetic determinists (and fatalists) have led us astray: they claim it is our "animal nature" to be aggressive, yet even animals stereotyped as interminably warlike can suspend their territorial behavior. They opt for peace whenever their essential needs are met, or when the cost of territorial behavior becomes too high. And as ornithologist Amadeo Rea has pointed out to me, "hummingbird fighting, warfare, etc., are not really homologous to human activities of the same name. How many dead hummers do you find in the

chuparosa patch? How many bloodied, maimed victims? Their fighting . . . is probably only to exclude, not destroy, a rival male."[4]

The Aztecs called the hummingbird *huitzitzil*, "shining one with (a weapon like) a cactus spine." Yet for all its feistiness, the hummingbird does not embody the incessant irascibility attributed to it by certain historic and modern observers. Do such ascriptions actually tell us more about the Aztecs—or the sociobiologists—than they do about the bird itself? If human warfare is not homologous to that found in other animal species, what is its derivation? Is it somehow peculiar to the genes of Homo sapiens, or is it false to claim fatalistically that human aggression is genetically determined? I go back into the desert to answer these questions, a colorblind botanist seeking clues that those with normal vision may not be able to detect. And I turn my vision from the hummingbirds—most of which have taken flight by this time—to the human being, whose tracks are still evident all around me.

III

Now it is April. I'm up above the desert floor on the ridge overlooking the High Tanks. Last night, I tucked my sleeping bag into a rock shelter, a cave-of-sorts shared with an old friend and a few packrats. We had hoped to see desert bighorn come in for water. This niche in the granite formerly kept O'odham hunters out of sight until they were ready to jump the wild rams and ewes trapped in the canyon. I dream of seeing sheep approach, and I imagine myself a primitive hunter from centuries past, hot in the pursuit of big game.

Suddenly, I am jogged from my reverie by the realization that we are being pursued. My friend Susan has noticed that an armored vehicle has lumbered up out of a wash, heading straight toward our parked pickup truck on the desert floor below us.

We watch, silent, hidden in the rocks, as the tanklike all-terrain vehicle stops fifty yards away from our truck. Its passengers do not immediately get out to breathe the fresh morning air. We wait for the doors to open. More than a minute passes.

Simultaneously, all the doors swing open and six soldiers land on the ground, automatic rifles in hand, spreading out. They slowly stalk the truck, fingers ready on the triggers. Forming a semicircle ten feet out

[4] Rea, a retired curator of birds and mammals at the San Diego Museum of Natural History, made this remark to me during a telephone conversation in May 1991.

from the back and sides of the truck, weapons aimed at all openings, the men look ready to move in for the kill.

"Campers!" I yell, immediately regretting it. In the folk taxonomy of the military, the word "campers" does not necessarily conjure up a contradistinction to "drugrunners," "wetbacks," or "Arab undercover agents." It does not bring the same sigh of relief that "garter snake" brings, when the other choice might be "sidewinder." Half the armed men now point their weapons toward the wash from which they sense my yell was emerging. I wince, remembering another time on the Camino del Diablo when a border guard held me at gunpoint, my hands behind my back, belly to the ground, for a half hour of questioning. He had been sure that I was a drug smuggler, unconvinced that anyone who arrived on his borderline beat at dawn was there merely to watch birds. From that distasteful experience, I knew that I had to assure the boys below that they were not stalking aliens from another planet or continent.

"Campers! It's okay! It's okay!" I yell again, waving my Panama hat back and forth, in case they needed a moving target. The echoes must have confused them, as they have confused me when I have tried to locate a calling owl while standing near its position below the cliffs. Then, one of the GI's spots my movement, raises field glasses to his eyes, and gives Susan and me a quick once-over. Another lowers his rifle, and raises his binoculars as well. There is some talking, largely below earshot, all beyond our comprehension. They all release their fingers from their triggers and sulk back to the armored vehicle. Another minute passes, and they are gone.

The season of heightened hummingbird aggression has passed, but my preoccupation with human aggression is bursting its buds. The military visitors to Tinajas Altas departed silently, without incident. Still, that did not leave me much solace. As Susan and I descend into camp and return to the truck, the air there is choked with a sense of aggrievance. It is perhaps like the feeling of violation that one feels for months after one's house has been robbed; physical violence may have been avoided, but any measure of psychological peace has been shattered.

At the same time, I feel foolish for expecting human presence in a place such as the High Tanks to have any smackings of tranquility. As my mind rolls over just a few of the incidents that have been staged here over the years, I realize that there are few desert routes in the world that have been soaked in as much blood as has the Camino del Diablo. I remember how Teddy Roosevelt's son Kermit described Tinajas Altas and its desperados during a hunting trip in the August heat of 1910:

> This is a grim land, and death dogs the footsteps of those who cross it. Most of the dead men [buried below the Tanks] were Mexicans who had struggled across the desert only to find the tanks dry. Each lay where he fell, until, sooner or later, some other traveller found him and scooped out for him a shallow grave, and on it laid a pile of rocks in the shape of a rude cross. Forty-six unfortunates perished here at one time of thirst. They were making their way across the deserts to the United States, and were in the last stages of exhaustion for lack of water when they reached these tanks. But a Mexican outlaw named Blanco reached the tanks ahead of them and bailed out the water, after carefully laying in a store for himself not far away. By this cache he waited until he felt sure that his victims were dead; he then returned to the tanks, gathered the possessions of the dead, and safely made his escape.[5]

Add to the human corpses at least twice as many livestock carcasses, and you've arrived at a paradise-and-lunch for vultures, were it not for the long wait between courses. When carrion feeders were not enticed to dine in such an out-of-the-way place, the flesh slowly sizzled to beef-jerky consistency on the skilletlike desert pavement. I've measured temperatures of 170 degrees at ground level near here, on a summer day that was not particularly hot. In 1861, when New York mining engineer Raphael Pumpelly rode the Camino during the period of peak heat, he wondered if he had stepped beyond the familiar into another world. The following is from his *Across America and Asia*, published in 1870:

> We were approaching the Tinajas Altas, the only spot where, for a distance of 120 miles, water might at times be found. It was a brilliant moonlit night. On our left rose a lofty sierra, its fantastic sculpturing weird even in the moonlight. Suddenly we saw strange forms indefinable in the distance. As we came nearer our horses became uneasy, and we saw before us animals standing on the side of, and facing the trail. It was a long avenue between rows of mummified cattle, horses and sheep.[6]

Pumpelly's handwritten journal, not published until 1918, gives the incident in more detail:

> The pack animals bolted and Poston and I rode through with difficulty. Ten or twelve years before, during the time when meat was worth in California almost its weight in gold dust, it paid to take the risk of losing on this desert nearly all of the herd, if a few survived. If no water was found at the Tinajas, most or

[5] *Happy Hunting-Grounds* (New York: Charles Scribner's Sons, 1920), pp. 73–74.
[6] New York: Leypoldt & Holt, p. 105.

> all of the animals and some of the men would die. In the intensely dry and pure air there was no decomposition. All the dead simply became mummies. The weird avenue had been made by some travelers with a sense of humor and fertile imagination which had not been deadened by thirst. . . .[7]

A thirst of another sort drove miners and buckaroos across the desert, and moved Blanco the Bandito to empty all the water out of the plunge pools: greed. Life did not matter as much as money or material possessions. Those who rode down the Camino del Diablo did not care about the places they were passing through or the life that they might encounter along the way. Some of the native O'odham, first recorded in residence at Tinajas Altas in 1699, had adopted the same attitude by the midnineteenth century. They had made a pastime out of robbing, and infrequently killing, Forty-Niners en route to California.

Such conduct disturbed their neighbor Tom Childs, the first white man to marry into the Sand People or Hia-Ced O'odham. Tom finally asked one of the Indian bandits, José Augustin, "Why did you kill the Camino travelers?"—and Augustin responded with matter-of-fact brevity: "For their sugar, tobacco, and coffee."[8]

This quip must have struck Childs as anomalous, for the O'odham—including the Sand People—have been known for a century and a half as "the Peaceful People." In anthropologist Ashley Montagu's global search for cultural models of nonaggressive behavior, the historic O'odham were included among the two dozen societies least prone to violence.

Despite recent rises in family violence where substance abuse has affected them, the O'odham people as a whole can still be characterized as one of pacific temperament. I have had the good fortune to have worked, eaten, and slept in the homes of several O'odham families over the last sixteen years, and I have been moved by their peaceable nature: a humility and a live-and-let-live commitment to conflict evasion underscore most of their cross-cultural interactions with neighbors and visitors. The historic literature on the "Pima, Desert Papago, and Sand Papago," as they were formerly called, reiterates an O'odham avoidance of violence.

During World War II, with the support of their elders, the young men of an entire village refused to be inducted into the military. Other O'odham, of course, have dutifully participated in the Armed Services

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[7] *My Reminiscences* (New York: Henry Holt).

[8] Wilton Hoy, *Organ Pipe Historical Research* (Lukeville, AZ: Organ Pipe National Monument, 1970), p. 71.

rather than raise a ruckus, the best known being the Pima Indian hero at Iwo Jima, Ira Hayes. Like Hayes, however, many came back from the service profoundly disturbed by what they had participated in, and some died from the alcohol or drugs taken to deal with the cultural collisions. Anthropologist Ruth Underhill has argued that for the traditional O'odham, "War . . . was not an occasion for prestige as with the Plains tribes nor of booty as with the Apache. It was a disagreeable necessity. The enemy . . . or anything that had touched him, was taboo. Therefore all booty was burned and the man who had killed an enemy or who had been wounded by him had to go through a long ordeal of purification."[9]

These words are echoed by those of ethnohistorians Clifford B. Kroeber and Bernard L. Fontana, who worked together for three decades on the major work—*Massacre on the Gila*—concerning intertribal warfare among Southwest Indians: "While they were perfectly capable of taking the offensive, Pimas and Papagos [O'odham] seemed to have done so only when revenge was called for or as a counter-offensive to protect lives and property. There is little to suggest that northern Pimans ever made raids for the sole purpose of obtaining booty. . . . Neither does it appear that northern Pimans engaged in ritualized formal battles with their Apache and Yavapai enemies [after] 1698."[10]

Indeed, the first O'odham raids on Camino del Diablo travelers may have been in response to finding a year's supply of water consumed by cattle, horses, and journeymen during a single day's stopover. When Padre Kino came into the area around 1700, his livestock drank dry one tinaja after another. In response, the able-bodied O'odham men did not immediately fight, but fled instead, leaving only the smallest children and infirm elders to be baptized by the Jesuit father. It was not until Anglos and Mexicans began draining the plunge tanks of the Camino with frequency—during the California Gold Rush—that the O'odham sought to discourage travelers along the route.

Like the !Kung Bushmen of the Kalahari and Australian aborigines of the Red Centre, the O'odham of the Sonoran Desert developed traditions which put a damper on aggressive behavior, and a premium on cooperation. *In Anger: The Misunderstood Emotion*, psychologist Carol Tavris writes of desert nomads so dependent upon unpredictable environments that "Their only insurance against hard times is each other. No individual can lay-in a supply of frozen pizzas and beer in the event of

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[9] *Social Organization of the Papago Indians* (New York: Columbia University Press, 1939), pp. 128–29.

[10] Tucson: University of Arizona Press, 1986, p. 56.

famine and drought, and no individual could long survive on his or her own. . . . Under such conditions, any antisocial or angry outbursts threaten the whole group; so it is to the [desert dweller's] interest to avoid direct physical confrontation or violence, and to be suspicious of individuals who cannot control their behavior or their tempers."[11]

Further, Tavris sees nothing innately aggressive in human beings: "It is the world, not the genes, that determines which way it will go." Yet I've recently come to realize that such an issue has become a virtual battleground within academia. Sociobiologists such as E. O. Wilson (in his *On Human Nature*) still maintain that "human beings have a marked hereditary predisposition to aggressive behavior."[12] Wilson does concede, however, that aggression is not tied to a single gene, adaptive syndrome, or racial lineage, and he also expressed other ambivalences; he argues that our territorial expressions are often responding to the same resource-scarcity problems that direct other animals toward territoriality, but at the same time he is convinced that our aggressive expressions are peculiar. "Most significantly of all," he asserts, "the human forms of aggressive behavior are species-specific: although basically primate in form, they contain features that distinguish them from aggression in all other species" (p. 99).

To my mind, Wilson shifts between two parallel ruts, arguing that we have aggressive (animal) responses but that our scholars and political leaders can lead us into more diplomatic resolutions of conflict if they choose pacificism as a goal. He hardly takes into account the vast terrain between these ruts. His scientific parables are fixed on the notion that our behavior can be explained by understanding the evolutionary history we share with other species. While rightly emphasizing that we respond to many social or environmental stresses and conflicts much the way other organisms do—there are only so many options—he often glosses over critical differences in context and intent.

Nevertheless, one of Wilson's paradigms may shed light on the hummingbirds which become territorial around dense patches of chuparosa in the middle of nowhere, and on the O'odham who do the same with plunge pools. A territory, Wilson notes, invariably

> contains a scarce resource, usually a steady food supply, shelter, space for sexual display, or a site for laying eggs. . . . [T]erritorial behavior evolves in animal species only when the vital

[11] New York: Simon and Schuster, 1982.
[12] Cambridge: Harvard University Press, 1978, p. 100.

> resource is *economically defensible*: the energy saved and the increase in survival and reproduction due to territorial defense outweigh the energy expended and the risk of injury and death. . . . [I]n the case of food territories the size of the defended area is at or just above the size required to yield enough food to keep the resident healthy and able to reproduce. Finally, territories contain an "invincible center." The resident animal defends the territory far more vigorously than intruders attempt to usurp it, and as a result the defender usually wins. In a special sense, it has the "moral advantage" over trespassers.

I tend to agree with Wilson that it is somehow "natural" for indigenous desert people to defend a waterhole from intruders, much the same way we accept the territorial pugnaciousness of hummingbirds. But because such aggressiveness is oftentimes relaxed when resources become more abundant or widely dispersed, neither the hummers nor the hunter-gatherers seem inexorably fixed on fighting. Be that as it may, cross-cultural comparisons suggest that most societies fight for reasons other than those obviously related to their immediate physical survival. Only ten percent of so-called primitive cultures maintain a constant peace with their neighbors. For the sixty-four percent that skirmish with neighbors at least once every two years, many but not all of their conflicts are concerned with competition for basic resources. Cultural evolution has left us with tensions not easily explained by addressing only the driving forces of natural selection: the need for food, water, and shelter; the urge to reproduce and keep our genes "alive" in the form of offspring.

That is why there is something profoundly disturbing—perhaps unprecedented in mammalian evolution until 10,000 years ago—about Blanco the Bandit. By draining the plunge pools, he left all later travelers without access to an essential resource. If there is something peculiar about us latter-day human beings, it is our ability to opt for destroying a resource essential for everyone's survival, rather than simply controlling a competitor's access to it. In this new game—untried in an evolutionary sense—neither the resident nor the intruder ultimately wins. As the resource vanishes, all potential users are inevitably vanquished.

IV

For weeks, the tension had mounted. Young, hormone-charged men stood on the south side of a line, like so many hummingbirds waiting for the ice to break up north, for the season to burst with activity. First Lieu-

tenant John Deedrick likened the mood on the front lines to the waiting in a blind while hunting deer: "Just like being in a tree stand. You're cold and miserable and you just have to wait."

Then, the Desert Storm let loose like an ejaculatory release from an eighteen-year-old: after an all-out war of some one hundred hours, the boys were done. The troops were coming home, having freed the oil fields of Kuwait from a despot's control. American soldiers were regaining the solid manly image that had been deflated during the sixties. "By God," George Bush exclaimed, "we've kicked the Vietnam syndrome once and for all!"

Lingerie sales in America reached a new all-time high, as women swooned for the victors. The boys were a bit embarrassed: "I think its kinda shallow that a girl might want to make it with me just because I was over there. . . . Fun, but shallow."[13]

As anthropologists Fontana and Kroeber see it, ever since farming overtook hunting as society's primary means of support, young men have been trying to figure out what they can excel at that women cannot. The hunter's prowess, tenacity, and dignity, which once won him access to the most attractive and fecund mates, evaporated when both men and women began to share in the chores of agrarian society. Women had already been tending plants for centuries, domesticating them and possibly bringing in far more calories than male "breadwinners." As landscapes became tamed and men spent less time on the mythic wild proving grounds, they abdicated a primordial connection that had given them their meaning. What many people came to feel, Kroeber and Fontana have recently said aloud: "Women could do all the work necessary for society's physical survival. Males were potentially persons of great leisure. Or . . . ," as they rather bluntly state, "males were potentially all but useless."

Men swerved off course, from the sacramental and nutritionally justified bloodletting of hunting to that of warfare, even when the gains did not justify the risks. Another hunger grew in men's loins that made them want to taste blood, to be on top. And this hunger, seldom satisfied, sticks with many men today. Never in history have men been so useless; a woman can now go to a sperm bank and be fertilized without ever having to touch her child's biological father. No wonder Robert Bly's "Gathering of Men" has captured center stage in a formerly floundering men's movement. It sees the male loss of meaning beginning with the

[13] Unidentified serviceman, speaking in the spring of 1991 on a radio call-in program, "The Jones and Boze Show," broadcast over station KXCI in Scottsdale, Arizona.

Agricultural Revolution, which took men out of contact with the wild, disbanding the fraternity of the Big Woods.

No boot camp or campus fraternity hazing has ever made up for that lack. Far from the mythic rite of passage that it once was for males in many societies, military service too has become an objectified routine of monitoring computer printouts and calculating missile trajectories from remote locations. The bombing of targets has become so depersonalized by the jargon that one might as well be playing Pac-Man. The young technicians simply "took out targets" and euphemistically referred to any human presence in those debilitated places as "collateral damage."

American audiences responded to the Gulf War with much the same fervor they usually reserve for the made-for-TV Super Bowl. Arab-bashing has become a new spectator sport: "Operation Desert Storm" cards come with bubble gum in packages remarkably similar to those in which our boys find the faces of Larry Bird, Bo Jackson, and Michael Jordan.

Even if the government's pathological lies about the war disturbed some Americans, it was fortunate for Bush that Saddam Hussein still seemed downright evil, while we only seemed sick. Of course, that perception was largely influenced by the White House media machine. Who else could be better cast in the role of Blanco the Bandit than Saddam Hussein himself? Rather than emptying out the tinajas of all their water, he shrewdly set fire to the scarcest resource underpinning our global economy: fossil fuel. While more than five hundred wells burned like battle torches day after day, enough oil was going up in smoke to meet a tenth of the world's daily consumption.

"If Hell had a National Park, this would be it," mourned the Environmental Protection Agency's director William Reilly on the *Today* show just after his return from Kuwait on 7 May 1991, hardly two months after the Gulf War "cease fire." The fires, of course, had not ceased: it would take months to extinguish all of them, and as each month passed with the blazes unabated, they added to the atmosphere as much as a million tons of sulfur dioxide, a hundred thousand tons of nitrogen oxides, and 2.5 million tons of oil soot—the latter amount being more than four times the monthly emissions from the entire United States. All told, the war contributed four percent of the world's total carbon release by the end of 1991, thereby accelerating global warming over the long run.[14]

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[14] Tony Burgess, "Trip report to Saudi Arabia and Kuwait, for Friends of the Earth," unpublished manuscript.

And yet, President Bush still claims that Desert Storm made the victory swift, and the long-term damages minimal. Unfortunately, his antiseptic war was never that at all; over a hundred thousand were dead within a month, with twice that many wounded, crippled, or contaminated with toxins. Many more people were deprived of potable water and food for months on end, and it is now estimated that only one tenth of the deaths occurred during the "official" war. Environmental destruction proceeded on an unprecedented scale and left unsanitary remains that will persist indefinitely.

To console us, William Reilly announced in doublespeak (during that same *Today* interview) that "President Bush cares as much about the environment as he did about winning the war."

However, the current condition of the fragile desert left behind by a million troops does not give credence to this platitude. Scars left by helter-skelter driving of military vehicles will be seen in the vegetation and soils for anywhere from 100 to 1,000 years. In some places, observers found the desert biologically sterile following the war; elsewhere, remaining plants were covered with a crust of soot, oil, and wind-drifted sand. Massive defense berms interrupted watercourses, and countless bomb craters were not exclusively the result of Iraqi actions. Further, the US Air Force admits that it left behind nearly nine thousand tons of undetectable explosive materials in desert areas. In terms of exploded refineries and burning lakes of oil, the culpability is blurred. "Who knows who set what off?" asked Tony Burgess during a telephone interview. Burgess is a desert ecologist who spent three weeks with Friends of the Earth in the Gulf assessing environmental damage: "The country was so trashed. It literally was a vision from Hell."[15]

We have only an inkling of how far that hellish apparition will spread, but Burgess has assured me that the oil fires are bound to have profound, pervasive global ramifications. Using the greasy soot particles resulting from the burning oil fields as but one example, Burgess told me that "effects from the Kuwaiti smoke plume have already been picked up in Australia and Hawaii," more than eight thousand miles away from their source. From the snows of the Himalayas to the headwaters of the Blue Nile, acid rain and carbon soot have been accumulating at unprecedented levels.

Petroleum engineer John Cox regards the magnitude of carbon soot from Kuwait, Iraq, and Saudi Arabia to be more concentrated and there-

[15] Information and statistics in this paragraph were gathered during a telephone conversation with Tony Burgess in June 1991.

fore more devastating than what would be expected were a nuclear winter to occur. He explains why the Kuwaiti smoke plume has already been so widely dispersed: "If you are in a rainy area, a very high proportion of the smoke is going to be washed out. If, however, you are in an area that is already dry—and the microclimate around Kuwait is very dry—and you have an intense temperature, then the chances are that the smoke cloud will go to a much greater height than the nuclear war simulations suggest.... [There will be] a major effect upon the growth of vegetation and crops."[16]

This is not the maverick opinion of one self-styled expert, but that of the Greenpeace organization as well, which claims that the Gulf War already ranks as one of the most ecologically destructive conflicts ever. According to Andre Carothers, Kuwaiti officials have begun to concede that the environmental damages of the war have been more crippling than any material losses incurred during the hundred days of armed conflict.[17] And that, to my mind, is the fatal deviation, the divergence of our path from that of our sometimes pugnacious biological ancestors and neighbors on this planet. Although sociobiological scholars may still smugly argue that "we are far from being the most violent animal," the damage our kind has done is suffusive enough to be all-encompassing.

Hummingbirds skirmishing over chuparosa, O'odham and Quechan Indians vying for a waterhole, or Kuwaitis and Iraqis battling over an oil field may appear to be parallel parables of territorial disputes over scarce resources in the desert. But the latter battle has the capacity to damage a broad range of resources required for life now and in the future—indeed, to damage irreparably the capacity for life support within our planet's atmosphere. Gone are the days when ritualized warfare affected control over only one waterhole, one food-gathering ground, one territory.

The verbal antagonism between Saddam Hussein and George Bush on television was a pathetic throwback to esoteric jousting by medieval sportsmen, who lived in a time when the stakes were low and the damage local. We can no longer speak of competition for a single, concentrated resource; a life-support system dependent upon widely dispersed, vitally important resources is now under threat. Compared to other centuries, the number of wars within and between nations has increased during this century, despite pacifying efforts by the United Nations and other mediating bodies. If Bush or Hussein had the mentality of a hummingbird, it

[16] "Waging War against the Earth," *Environmental Action* (March/April 1991), p. 22.
[17] "After the Storm: The Deluge," *Greenpeace Magazine* (Oct./Nov./Dec. 1991), 17.

would be clear to them that the resources crucial to our survival are no longer economically or ecologically defensible through territorial behavior. These resources are too diffuse, too globally interdependent, to be worth the risks both leaders have placed before us. But what a hummingbird can surmise with its senses in a matter of hours or days, our species must muddle through, argue about, and even shed blood over for decades.

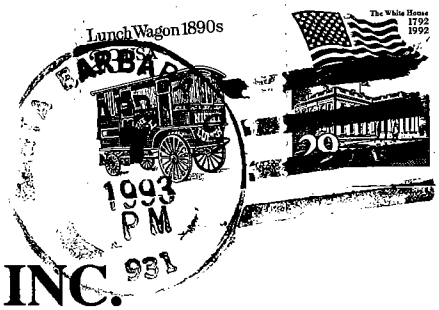
V

I am back, in the dead of the summer, on a desert wash near the international border where hummingbird bushes like chuparosa exhibit a few last, ill-fated flowers withering in the heat. A fire has burnt a patch along the border today. Dusty whirlwinds are everywhere, turning and churning in the drought-stricken air. A hummingbird whirrs by me. I turn to see if he is being chased, then back to see if he is in hot pursuit of another. He is not. We stop on opposite sides of the wash, which is wide enough to let us pause for a moment without feeling on top of one another.

As I pause, I think of the O'odham name for Tinajas Altas: *O'ovak*, "Arrowhead Sunk." The Sand People tell about two of their fellow O'odham who climbed to one of the ridges overlooking the steep-sided canyon where the precious pools of water are found today. One of these two warriors challenged the other to a contest: who could shoot an arrow all the way across the canyon to the far ridge?

As my O'odham friends tell it, the first man's arrow cleared the canyon, but the other's did not. Instead, it glanced against the bedrock in the drainage, skipped along, then sunk into the granite. Wherever it had struck the rock, however, a pool of water formed, and the O'odham and their neighbors have used these plunge pools ever since. Retelling this story, my friends express their gratitude for the unlikely appearance of water, wherever it emerges in the desert.

I turn to the hummingbird and think, "Who, then, won the contest? The warrior demonstrating the greatest facility with weaponry, or the one who helped make a lasting resource for all people?" Laughing at myself, at the long and winding trails my answers take, I leave the wash with one last gesture to the hummer. "You must be my teacher," I offer, palms open to his direction. "We're here together." I am beginning to learn what we share in common—this earth—and what differences in behavior I cannot bear to let come between us.



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