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A Magic Kingdom

COME BACK WITH me to October 1935, to Pensacola, for a walk up Palafox Street. Let's start by peeking over the seawall that closes the south end of the street. Down there on the rocks, kept wet and alga-covered by the softly lapping water of the bay, sits a congregation of grapsid crabs. They resemble large black spiders, with crustacean skins, carapaces the size of silver dollars, and clawlike legs that spread straight out from the sides of the body. They rest on needle-tipped feet, alert and ready to sprint forward, backward, or sideways at the slightest disturbance. Drop a pebble among them, and those closest to impact scurry for cover.

Let's turn and stroll north along the street, just looking around. On the right is the Childs Restaurant, where the courthouse crowd gathers for lunch. Stop for a moment and pass your hand through the light beam across the entrance. The door swings open, a miracle of modern technology. Do it again; this time let the couple waiting behind you walk on through. People don't seem to mind kids' playing with the beam. A little farther along is the Saenger Theater, Pensacola's premier palace of pleasure, in summer "cooled by iced air." This Saturday's matinee bill is an episode of the Flash Gordon serial (Flash escapes from the lair of the fire dragon), followed by Errol Flynn in *Captain Blood*. You've seen the feature; there's a scary scene near the end in which Flynn skewers Basil Rathbone in a duel on the treasure island, and the treacherous French pirate falls dying in the surf.

This section of lower Palafox, west to Reus and east to Adams, is the busy part of town. Model A Fords are on the street, a pretty good crowd of shoppers on the sidewalks. Be careful when you cross Romana Street up ahead; a kid on a bicycle got run over there last year; that's what they told me.

It's hot, as always. North Florida is still a tropical place in the early fall. Afternoon thunderheads are gathering to the south and west across the bay. No breeze has kicked in yet; the air hangs heavy and moist and laced with engine fumes. Let's

cross Palafox over to the courthouse, on your left. On the lawn next to the sidewalk a fire ant colony is swarming. The ants are pouring out of a mound nest, here no more than an irregular pile of dirt partly flattened by the last pass of a lawnmower. Winged queens and males are taking off on their nuptial flight, protected by angry-looking workers that run up and down the grass blades and out onto the blistering-hot concrete of the sidewalk. The species is unmistakably *Solenopsis geminata*, the native fire ant, I can tell you now. Another fifteen years will pass before the infamous *Solenopsis invicta*, imported from South America, will spread this far east from its point of introduction, Mobile, Alabama. I'll be here as a college student to watch that happen.

Walk a few more blocks, on past the old San Carlos Hotel (they've torn it down since), and cut left on West Gregory Street. My parents' apartment, one of two on the second floor of a stucco Spanish-style building, is several blocks farther down. There is a large live oak in the side yard where bluejays land and shriek at one another. Their call is like a fire engine's siren, always announcing some emergency or other.

On the sidewalk (please turn your gaze downward occasionally and look with me for insects on the ground) lion ants of the genus *Dorymyrmex* run like whirligigs on the stove-hot surface. Crush one, and the unmistakable smell of a dolichoderine ant hits your nose. I can tell you now that the odor of this species comes from a mix of heptanone and methylheptenone, secretions from the pygidial glands the workers use to defend the colony against enemies and alarm nestmates to approaching danger.

Forty years later I will return to within a few feet of this exact spot. I will get down on my knees (an elderly black man passing by will ask me if I need help) and look again for the lion ants. The dirt and cracked concrete slabs will look the same, but this time the ants running around will be *Pheidole dentata*, which lack a strong odor. Same thing fifteen years later. I'll keep coming here from time to time whenever I visit Pensacola, to see if the *Dorymyrmex* have returned to this special square yard or two of space. So far, my surveillance has lasted for nearly sixty years; if I am fortunate, it will last for eighty. Meanwhile, I can tell you that the ant present in 1935 was a *Dorymyrmex*.

You will think this a strange journey and a stranger obsession, but not I. Consider how long-term memory works. With each changing moment, the mind scans a vast landscape of jumbled schemata, searching for the one or two decisive details upon which rational action will be based. The mind with a search image is like a barracuda. The large predatory fish pays scant attention to the rocks, pilings, and vast array of organisms living among them. It waits instead for a glint of silver that betrays the twisting body of a smaller fish. It locks on this signal, rushes forward, and seizes the prey in its powerful jaws. Its singlemindedness is why swimmers are advised not to wear shiny bracelets or wrist watches in barracuda waters.

The human mind moving in a sea of detail is compelled like a questing animal to orient by a relatively few decisive configurations. There is an optimum number of such signals. Too few, and the person becomes compulsive-obsessive; too many, and he turns schizophrenic. Configurations with the greatest emotional impact are stored first and persist longer. Those that give the greatest pleasure are sought on later occasions. The process is strongest in children, and to some extent it programs the trajectory of their lives. Eventually they will weave the decisive images into a narrative by which they explain to themselves and others the meaning of what has happened to them. As the Talmud says, we see things not as they are, but as we are.

Our remembered images are reinforced like pictures improved by one overlay upon the next, each adding finer detail. In the process edges are sharpened, content refined, emotional colors nuanced. In this way, for me Pensacola on a hot autumn day in 1935 has evolved into a network of vividly remembered small animals. There is a backdrop of people, streets, a theater marquee, and houses; but although these parts of my world were important then, they have faded since.

I was a normal boy, within reason. I had friends, played rough-and-tumble games in the yard of nearby P. K. Yonge Elementary School, was ashamed and tearful when kept after class for misbehavior, had a wonderful Christmas that year, obeyed my parents but had to be forced to eat asparagus, and in the gentle Gulf winter, when leaves had fallen and a scum of paper-thin ice coated the gutter puddles, I searched the ground with other boys for pecans and chinquapins. But sixty years

have drained these memories of most of their importance, and the fine details and emotional force have largely eroded away to nothing.

They have done so, and natural history has been reinforced, because at an early age I resolved to become a naturalist and a scientist. And I took that course in part, if there must be an explanation, because I was an only child who lived something of a gypsy's existence. My mother had legal custody, and we were to remain thereafter very close, but she allowed my father, who had a better job, to care for me on a provisional basis. He remarried in 1938. I acquired a devoted stepmother named Pearl, and the temporary arrangement was extended. My father, a government accountant, for some reason preferred road assignments. He began an odyssey across the southeastern United States, changing his job and the location of his home every year or two. My itinerary from the fourth grade to high school graduation circled round and about the South as follows: Pensacola, Mobile, Orlando, Atlanta, the District of Columbia, Evergreen (Alabama), back to Mobile, back to Pensacola, and finally Brewton and Decatur in Alabama, with intervening summer sojourns in Boy Scout camps and homes of friends in Alabama, Florida, Virginia, and Maryland. Over eleven years I attended fourteen different public schools. In the summer before I started college we finally came back to Mobile, my father's birthplace, which he had said earlier he hated and had "taken off the map"; but now he changed his mind, and it was there he was to remain until he died, in 1951.

A nomadic existence made Nature my companion of choice, because the outdoors was the one part of my world I perceived to hold rock steady. Animals and plants I could count on; human relationships were more difficult. With each move I had to insert myself into a new group of peers, mostly boys. At first, before my father remarried, we lived in boardinghouses, from which I ventured cautiously. In Orlando, our first port of call, I avoided schoolmates for a few weeks, out of fear. I conversed silently with myself, creating three boys in my head: I, me, and myself. I rescued bits of Spanish moss that had fallen to the ground and replaced them on the low branches of the schoolyard oaks. They were my friends, I thought; but the emotion I felt was self-pity.

I studied plants and insects around the streets of Orlando, a beautiful little city in 1938. I kept harvester ants in a jar of sand under my bed and watched them excavate. I discovered fairy tales in the school library, and took to reading every one I could find. I was transfixed by the magical choices between grisly death or eternal happiness. I did well in class, and came close to winning the school spelling bee (“Indain” instead of “Indian” was my undoing, still burned on my brain). No one paid any attention to my eccentricities. There were no programs for gifted or disturbed children in those days.

Nor was there any educational theory in 1938 to suggest that loneliness in a beautiful environment might be a good if risky way to create a scientist, at least a field biologist. After a few weeks in Orlando I discovered to my joy that one of the city lakes was within walking distance. I started fishing there for minnows and bream, taking care with the hook I baited and the fins of the fish I caught to protect the one eye I had left after the accident at Paradise Beach. I spent hours admiring a large alligator gar held captive in a cement pool in the small waterfront park. I went back and forth to the lake alone, keeping my own company and organizing my thoughts. Lantana hedges, laden grapefruit trees, and men in Panama hats still float through my surviving memories.

In towns and cities we settled in later I learned how to adapt more quickly in my perpetual role as new kid on the block. Once, early on in Mobile, I pretended to be deaf and dumb until I had a small, fascinated group of boys and girls following me in an attempt to read my ersatz sign language. When I admitted the hoax, all was well. They were relieved, and still fascinated enough to make me a popular new member of the gang. Usually I approached the problem straight on, by working myself into baseball games as an extra, or talking with other boys I saw standing alone at the edges of the schoolyard or lunchroom.

My worst difficulties came from the fistfights. They were merciless and brutal. I suspect that most adults, especially those reared in middle-class suburbs, cannot bring themselves to acknowledge the innate savagery of preadolescent boys. From the ages of nine to fourteen they are naturally predisposed to set up blockwide territories, run in gangs, and bully

to gain acceptance, to swagger, boast, dare, and call back and forth to one another in the loud honking voices of emerging male adolescence. Strange kids in the neighborhood, especially those without brothers or parents in view, are fair game. In the South of the 1930s and 1940s—here I have enough experience to speak like a sociologist—there was a certain protocol to the combat. One boy, usually the local bully or the “champion” of a group, challenged another boy, usually the newcomer. The fight was held after school in some secluded spot in the neighborhood where both lived. It was stand-up combat with fists, fought the way we saw Joe Louis do it in the newsreels. Except there were no rounds, and no conclusion until one boy gave up or an adult broke in. Word got around in advance, and a circle of boys gathered to hoot the pugilists on.

“One of ’em’s scared and the other’s glad of it!”

“Hey, that was just a love tap; wait’ll he gets goin’.”

Most of the fights I watched, I was in, maybe a dozen up to the age of fourteen. After that time boys of my age found other outlets for aggression, most commonly football or hunting. I can recall these battles like a sports historian ticking off rounds in the Dempsey-Tunney fight. I was deeply anxious about challenges, especially in a new neighborhood, and tried to steer clear of the more aggressive-seeming boys, always without success. My father told me never to back down, and the Gulf Coast Military Academy ethos forbade it. It was unmanly to refuse a fight. I did decline, however, twice, because the boys were too big to beat, and with a gang and from different schools anyway, and I knew I wouldn’t see them again. I retreated before their taunts, to my everlasting shame. It is ridiculous, of course, but I still burn a little when I think about my cowardice. I never picked a fight. But once started I never quit, even when losing, until the other boy gave up or an adult mercifully pulled us apart.

“Hey, hey, he’s had enough!”

“Okay, okay, let’s stop; I wanna stop.”

“This is a lot of shit, anyhow. I got to get home.”

I couldn’t stop. Somehow I felt that, having invested this much of my limited store of courage to take on a challenge, I must never throw it all away and suffer the added shame of losing. My face was sometimes a bloody mess; I still carry old

lip and brow split scars, like a used-up club fighter. Even my father, proud that I was acting “like a little man,” seemed taken aback. But later I savored the memories of my combat, and especially the victories. There is no finer sight on green Earth than a defeated bully.

My childhood was nevertheless relatively serene. Most of the time I simply found a best friend in new neighborhoods, a boy the same age and physical size who enjoyed riding bikes and exploring the nearest woods for snakes and insects. I was drawn to conspicuous introverts, and they to me. We stayed away from social activities at the school and the clubs and from the roving gangs of boys. Throughout, I was just as happy to be entirely alone. I turned with growing concentration to Nature as a sanctuary and a realm of boundless adventure; the fewer people in it, the better. Wilderness became a dream of privacy, safety, control, and freedom. Its essence is captured for me by its Latin name, *solitudo*.

So inevitably, and given that I was looking at the world with only one visually acute eye, I came to be an entomologist, a scientist who specializes in insects. To put the matter as simply as possible: most children have a bug period, and I never grew out of mine. But as in the lives of scientists generally, there is more to the story. Every child wants to visit a magic kingdom. Mine was given to me at the age of ten, when my father moved Pearl and me to Washington, D.C. We took up residence in a basement apartment on Fairmont Street near Fourteenth Street, within walking distance of the National Zoo and a five-cent streetcar ride to the National Museum of Natural History. A year later (possibly not wanting to risk putting down roots), my father moved us again, to a second apartment six blocks away, on Monroe Street. For me the central-city location, in what is now an all-black neighborhood, was an extraordinary stroke of good luck.

Here I was in 1939, a little kid, nine years old, tuned to any new experience so long as it had something to do with natural history, with a world-class zoo on one side and a world-class museum on the other, both free of charge and open seven days a week. Unaffected by the drabness of our working-class neighborhood, I entered a fantasy world made weirdly palpable by federal largesse. I spent hours at a time wandering through

the halls of the National Museum, absorbed by the unending variety of plants and animals on display there, pulling out trays of butterflies and other insects, lost in dreams of distant jungles and savannas. A new vision of scientific professionalism took form. I knew that behind closed doors along the circling balcony, their privacy protected by uniformed guards, labored the curators, shamans of my new world. I never met one of these important personages; perhaps a few passed me unrecognized in the exhibition halls. But just the awareness of their existence—experts of such high order going about the business of the government in splendid surroundings—fixed in me the conception of science as a desirable life goal. I could not imagine any activity more elevating than to acquire their kind of knowledge, to be a steward of animals and plants, and to put the expertise to public service.

The National Zoo, the second focus of my life, was a living museum of equal potency with the National Museum of Natural History. It was and is administered as part of the same umbrella organization, the Smithsonian Institution. Here I spent happy days following every trail, exploring every cage and glass-walled enclosure, staring at the charismatic big animals: Siberian tigers, rhinoceros, cassowaries, king cobras, reticulated pythons, and crocodiles big enough to consume a boy in two bites. There were also smaller animals that eventually became equally fascinating. I developed a liking for lizards, marmosets, parrots, and Philippine tree rats.

Close to the zoo was Rock Creek Park, a wooded urban retreat, into which I ventured on “expeditions.” In those confines, within earshot of passing automobiles and the conversations of strollers, I found neither elephants to photograph nor tigers to drop-net. But insects were everywhere present in great abundance. Rock Creek Park became Uganda and Sumatra writ small, and the collection of insects I began to accumulate at home a simulacrum of the national museum. During excursions with a new best friend, Ellis MacLeod (who was later to become a professor of entomology at the University of Illinois), I acquired a passion for butterflies. Using homemade nets made of broomsticks, coat hangers, and cheesecloth bags, we captured our first red admirals and great spangled fritillaries and sought the elusive mourning cloak along the

shaded trails of Rock Creek. We were inspired by Frank Lutz's *Field Guide to the Insects* and W. J. Holland's *Butterfly Book*. Poring over R. E. Snodgrass' *Principles of Insect Morphology*, which we could barely begin to understand but revered because it was *real* science, we decided we would devote our lives to entomology.

The course of my life had been set. While sorting through dusty files I recently discovered a letter to my parents written by my fifth-grade teacher at the Hubbard School on February 2, 1940, when I was ten years old: "Ed has genuine writing ability, and when he combines this with his great knowledge of insects, he produces fine results."

About this time I also became fascinated with ants. One day as Ellis and I clambered over a steep wooded slope in the park, I pulled away the bark of a rotting tree stump and discovered a seething mass of citronella ants underneath. These insects, members of the genus *Acanthomyops*, are exclusively subterranean and can be found only in the soil or in fallen pieces of decaying wood. The worker ants I found were short, fat, brilliant yellow, and emitted a strong lemony odor. The smell was the chemical citronellal, which thirty years later (in my laboratory at Harvard) I discovered is secreted by glands attached to the mandibles of the ants and, like the pygidial substances of the Pensacola *Dorymyrmex*, is used to attack enemies and spread alarm through the colony. That day the little army quickly thinned and vanished into the dark interior of the stump heartwood. But it left a vivid and lasting impression on me. What netherworld had I briefly glimpsed? What strange events were happening deep in the soil?

I devoured an article titled "Stalking Ants, Savage and Civilized," by William M. Mann, in the August 1934 issue of the *National Geographic*. In what was to be one of the more remarkable coincidences of my life, Mann was at that time director of the National Zoo. Like the still anonymous keepers of the museum, he became my hero from afar. To run a great zoo while writing about his adventures around the world with ants—what a role model! In 1957, when I was a beginning assistant professor at Harvard and Mann was in the last year of his directorship, he gave me his large library on ants (an important source for my later research) and escorted me and

my wife, Renee, on a special tour of the zoo. In 1987 I was awarded the silver medal of the National Zoological Park for my work on ants and other animals; at the ceremony I came home in a deeply satisfying way.

Always prone to closing and repeating circles in my life, I have often returned to the National Museum of Natural History. The denizens of that Olympus, all a new generation since 1940, have acquired names and faces and become friends and colleagues. The great collections they attend behind the closed doors are familiar ground.

There is today a quickening of purpose, a sense of rising importance and responsibility, at both of the institutions that influenced me fifty years ago. Michael Robinson, the director of the National Zoo as I write, in 1994, prefers to speak of his domain as a biopark, where animals will be released from the isolation of cages and terraria and placed in natural settings of plants and animals from their place of origin. The public can then view them not as caged curiosities but as parts of ecosystems, on which biological diversity—and the health of the planet itself—ultimately depend.

A short distance away, on the Mall, the curators of the National Museum of Natural History continue building one of the world's largest collections of plants and animals. They too must feel the future in their bones. Recent studies indicate that between 10 and 100 million species of plants, animals, and microorganisms exist on Earth, but only about 1.4 million have been studied well enough to receive scientific names. Many of these species are vanishing or being placed in imminent danger of extinction by the reduction of habitat and other human activities. The loss in tropical rain forests in particular, thought to contain a majority of the species on Earth, may exceed half a percent a year.

So there is a lot for those who study the diversity of life to do, a new respectability, and a great responsibility. But that is not the reason I am wedded to the subject. The boy who experienced the magic of the zoo and museum is still strong inside me. He is the puppet master of the man. I would have followed the same path regardless of what happened in the rest of the world.