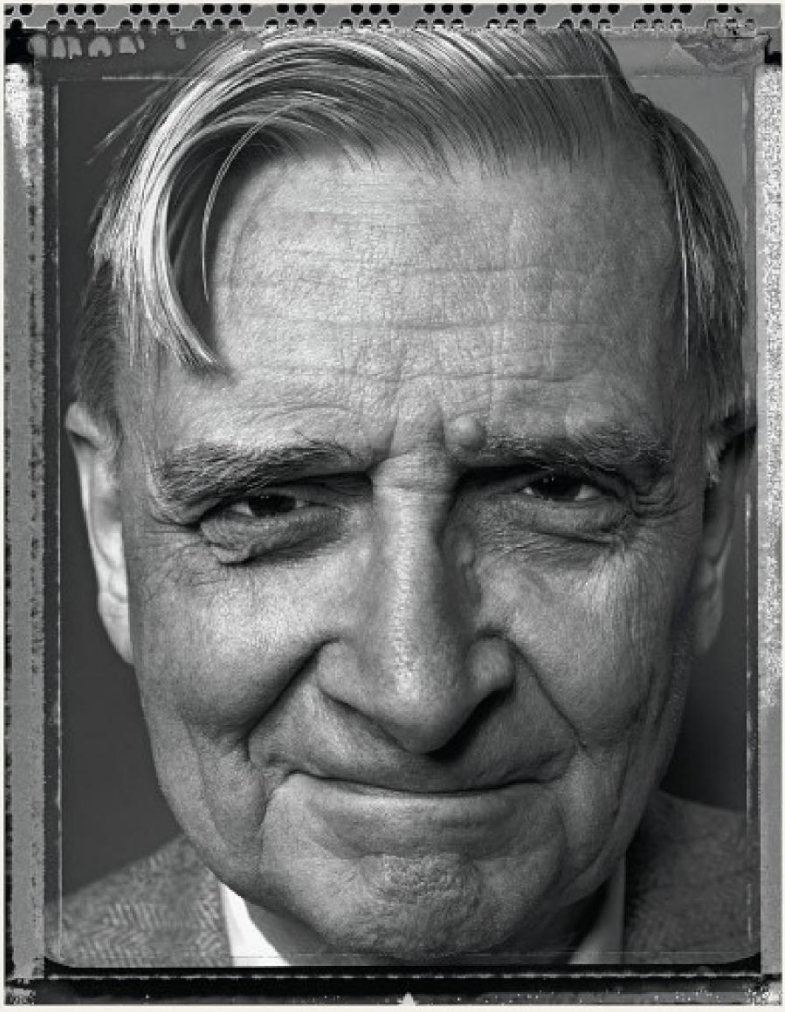
SCIENTIST

E. O. WILSON: A LIFE IN NATURE



RICHARD RHODES

WINNER OF THE PULITZER PRIZE

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Contents

1

Specimen Days

Museum of Comparative Zoology
at Harvard College
Cambridge 38, Massachusetts
Director's Room

November 2, 1954

To whom it may concern:
This will introduce Mr. Edward O. Wilson, a junior fellow in Harvard University. Mr. Wilson is traveling to Australia, Ceylon, New Guinea and New Caledonia for the purpose of collecting scientific specimens for the Museum of Comparative Zoology. Any assistance or advice you may be able to give him will be greatly appreciated.

Very truly yours,
Alfred S. Romer
Director

FINALLY, Ed Wilson was on his way, twenty-five years old, tall and lanky, the upper range of his hearing gone since his teens, his right eye ruined in a childhood accident: half deaf and half blind. Outwardly, he was a polite, soft-spoken product of Gulf Coast Alabama, the first in his family to graduate from college. But behind the well-mannered finish he was as tough as nails, as bright as the evening star, and no man's fool. He would become one of the half-dozen greatest biologists of the twentieth century. In the new century now advancing, he would lead the charge to save what's left of wilderness—half the Earth, he said—not only for the experience of wilderness but also for the millions of species large and small, many of them not yet even named, in danger of going extinct, forever. If they

did, he taught, they would take with them their supporting strands of the great web of life, unraveling the world. Trees can be replaced; species, having evolved into being across millions of years, are irreplaceable.

For now, a fresh-minted Ph.D., just setting out, his lifework before him, young Wilson was bound for the South Pacific to collect ants. Entomology was his field—insect biology—and ants were his specialty. No one had ever systematically collected ants across the vast sweep of the South Pacific. For ant specimens, many Pacific islands had never been explored.

The new frontier in 1954, after James Watson and Francis Crick's great 1953 discovery, was the structure and function of DNA. Biologists everywhere had run to their labs to inform their science with chemistry and physics. Wilson was deliberately running the other way. "If a subject is already receiving a great deal of attention," he explained his strategy later, "if it has a glamorous aura, if its practitioners are prizewinners who receive large grants, stay away from that subject."

Wilson was an explorer at heart, had been since he was a small boy. Rather than focus his work on one species, as most of his peers would do, he preferred to break new ground, find the big nuggets, assay them, and move on. If he'd started his life as an only child in the Gulf Coast South, chasing down snakes and butterflies, he'd arrived at Harvard for graduate study in 1951 as a certified prodigy. In a vacant lot in Mobile, Alabama, when he was only thirteen years old, he'd been the first collector in the United States to spot the invasion of the pestilential red imported fire ant, *Solenopsis invicta,* transported from Argentina as a ship stowaway. Seven years later, as an undergraduate at the University of Alabama, he'd published his first scientific paper.

Avoiding the crowd was a risky strategy—one that would reward him repeatedly across a long, successful career, but would also vex him with major challenges. "Take a subject instead that interests you and looks promising," his advice continues, "and where established experts are not yet conspicuously competing with one another.... You may feel lonely and insecure in your first endeavors, but, all other things being equal, your best chance to make your mark and to

experience the thrill of discovery will be there." The advice was vintage Wilson, potentially beneficial in equal measure to the curious boy and the ambitious adult.

A Harvard Junior Fellowship stood behind his one-man expedition to the South Pacific on behalf of the Harvard Museum of Comparative Zoology. The exclusive Society of Fellows, founded at Harvard in 1933, annually awarded a dozen exceptional young scholars three years of support for any research or study they chose to undertake. Across the decades, the ranks of Harvard Senior and Junior Fellows have included such well-known leaders as the presidential adviser McGeorge Bundy, the historian Crane Brinton, the Nobel-laureate physicist and Manhattan Project veteran Norman Ramsey, the strategic analyst Daniel Ellsberg, the economist Carl Kaysen, the transistor co-inventor John Bardeen, the artificial-intelligence pioneer Marvin Minsky, the geographer and historian Jared Diamond, the behavioral psychologist B. F. Skinner, and the U.S. poet laureate Donald Hall. In 1954, the Society added Ed Wilson's name to its list.

Collegial dinners every Monday night in term time introduced Wilson to such visiting stars as the charismatic J. Robert Oppenheimer, a high-school hero of Wilson's at the end of World War II, when Oppenheimer emerged as the so-called father of the atomic bomb. "Promethean intellect triumphant," Wilson would recall his assessment of the famous physicist, "master of arcane knowledge that had tamed for human use the most powerful force in nature." Junior Fellows were expected to attend such weekly dinners as well as twice-a-week luncheons with their peers. Wilson would miss a share of both in his nine-month Pacific expedition.

He would miss something—someone—else as well, a far more intensely personal deprivation. He and a young Boston native, Irene Kelley, dark-haired and pretty, had become engaged not long before, after a yearlong courtship. "The first time I ever saw you," he would remember and write her from New Guinea in March, "you came down the steps from upstairs at Shirley Hayes. In the back of my mind I said, 'What a pretty girl,' but also, 'not my type, probably a party girl of the first water, being rushed by various dancing dons of the cocktail-lounge set." How wrong he was, he wrote Irene, "how exciting

to me our courtship was, and how deeply satisfying to me when I began to sense your real qualities and we began to fall in love."

Irene was his first love. He had earned both bachelor's and master's degrees in only four years at the University of Alabama, carrying heavy course loads, studying through the summers, and there had been no time for dating. "My father was deteriorating rapidly," he recalled. "I could tell that I might not have any support whatever." So he had rushed through, and only now, with a Junior Fellowship in his pocket, had he begun to think of life beyond study and research. "I knew that I'd better start meeting some of the young women and developing a fuller life as an adult. In those days, the early fifties, the way you dated a young woman—or at least this was true in the South, where I'd come from—when you invited a young lady out frequently, you invited her to dinner and some kind of after-dinner entertainment, such as dancing. So I thought, I'd better learn how to dance."

He checked around Cambridge. "There was a very respectable-looking dance studio on Commonwealth Avenue which offered lessons in dancing, ordinary ballroom dancing. That's where I started my lessons." He was far from a natural. After a few lessons, preoccupied with study, he dropped out. But he was never a quitter. After a time, he began dancing lessons again. "And then I met this vision. Irene. She really was a beautiful young woman, and very gracious, even by Southern standards. I had just returned from Cuba and Mexico—my first fieldwork as a Junior Fellow. I was poorly dressed, and I was clumsy. She did the best she could with me. I just wasn't cut out for dancing. I couldn't even learn the fox-trot."

Though Irene wasn't a college graduate, she was smart and competent, both at dancing and in her day job in the Harvard University admissions office. She taught dancing in the evening for a reason Wilson immediately admired: to help support her family, which included a younger sister who was mentally ill.

"So I invited her out and we did not go dancing," Wilson recalled. "We did everything else. Fairly quickly, we became engaged. She had wonderful health at that time, and we walked practically every street in downtown Boston. We went to virtually every restaurant. We made

exploring restaurants our hobby. And in this way, we developed an idyllic romance."

Then, in his second year as a Junior Fellow, at about the time he and Irene were planning to marry, he was invited to collect ants in the South Pacific for the Harvard Museum. Going away for a year might have soured their romance. "I'd dreamed of doing this," Wilson told me, recalling his childhood expectations. "I realized it could be a tremendous personal experience for me—to be a pioneer, the first to go into areas where ants had never been collected before. I explained all this to Irene. We were engaged, but I told her, 'I really need to go.' It was something like a soldier leaving for war. I explained what an extraordinary advantage I was being offered, doing original work in a completely unstudied part of the world. And she said: 'Go.' And go I did, with each of us pledged to write each other every day."

The two said goodbye at Boston's Logan Airport on 26 November 1954, the day after Thanksgiving, both of them heart-stricken at the long separation that opened before them. "I am proud that you didn't cry," Wilson wrote her later that day from Louisville, where he had stopped over to visit his mother, "but I want you to know that it was the most painful thing I had ever experienced." He didn't cry, either, not when they separated, but as soon as he boarded he started "crying like a baby," he told her:

> It isn't very manful of me to behave like this, I know, but it is really the way I feel, and the way I believe and hope you feel. I love you more deeply than I can understand. This is the first and the last time I will ever fall in love like this, and, believe me, it is the last time we will ever part the way we did [today].

Three days later, Wilson was in Honolulu, marveling at the "incredible paradise" after wintertime Boston, and waiting for a flight to Fiji. With a stop to refuel on Kanton Island, a mid-Pacific curl of atoll with a six-thousand-foot World War II runway, his flight crossed the International Date Line and the equator and arrived at Viti Levu, the largest of Fiji's more than three hundred islands, at noon on the first day of December.

"Never before or afterward in my life," Wilson wrote later of that arrival, "have I felt such a surge of high expectation—of pure exhilaration—as in those few minutes…. I carried no high-technology instruments, only a hand lens, forceps, specimen vials, notebooks, quinine, sulfanilamide, youth, desire, and unbounded hope." His real high-tech instrument was his brain, his heart its engine. Eager to begin, he hired a car and driver to carry him directly into the island interior, where, in lush forest, he spent the last hour of the day collecting.

"I am really in a foreign country now," he wrote Irene early the next morning, before heading back to the forest for the day. The Fijians, he teased, "gave up cannibalism some time ago," but those in the interior "still live rather primitively in grass huts." A man he had met who had known one of the last cannibals on the island had passed on the Fijian's assessment that "human flesh was salty, not as tasty as pig."

Wilson collected that day in mountain forest in hard rain, climbing steep slopes through tangled undergrowth, and returned to his hotel "soaked and dog-tired." Fiji had been depleted of wild nature by logging and settlement and previously studied in depth by his predecessor William M. Mann; he wouldn't linger there. With the autograph of the chief of the Raki-Raki tribe—well-educated, in a torn T-shirt—mailed off to Irene for safekeeping, the young biologist departed Fiji by flying boat for New Caledonia the following morning. "I want to share everything I gain on this trip with you," he wrote his fiancée before he left, "and I sort of feel that I am undertaking every new adventure for you as well as for myself."

James Cook, the British navigator, discovered New Caledonia in September 1774, on his second voyage of exploration. An island about the size of New Jersey, some seven thousand square miles, but long, narrow, and mountainous, it reminded Cook of his native Scotland —"Caledonia" to the Romans—and so he named it. "It will prove at least 40 or 50 leagues [120–150 miles] long," observed his onboard naturalist, Johann Forster, "& is therefore the greatest new Tropical Island we have hitherto seen." Some nine hundred miles northeast of Australia, it was in fact the third-largest island in the Pacific, after New Guinea and New Zealand. The French seized it from the British

in 1853 and used it as a penal colony for both men and women until the end of the nineteenth century. During World War II, it hosted some fifty thousand Allied troops; the U.S. warships that fought the Battle of the Coral Sea in May 1942 had been harbored there.

New Caledonia would be Wilson's favorite Pacific island. French colonials and indigenes alike were friendly, and no professional had ever collected ants there. Wilson arrived on Saturday, 5 December 1954; by the next evening, he had already made two field trips, one to a valley forest outside the capital, Nouméa, a second to a nearby mountain.

Monday, 6 December, he stayed in town to go over his first day's collection. He found, to his delight, that he already had three or four new species. "My work here will no doubt have fabulous results," he wrote Irene. "I expect to double the known number of New Caledonian ants." He'd found his way as well to the New Caledonian Institut Français d'Océanie—the French Institute of Oceania—introduced himself, and worked in its entomological laboratory. New Caledonia was "relaxed and easy," he added, "with none of the British snap and discipline evident on Fiji." The place put him "in fine spirits" except for the high prices, running twice what he'd budgeted. Those he attributed to bad French management: "The reason for the high prices is that the French have a stagnated, unprogressive economy and little imagination to devote to the welfare of the colony."

He spent the next day working with a borrowed microscope in the lab at the Institut Français, preparing his new specimens, buoyed by a week's worth of letters from Irene that had arrived all in one batch that morning. He'd arranged them to read in chronological order. "It wasn't too hard setting my mind back a week as I read what you were thinking from day to day," he wrote her. "It made me very happy and carried me back to you in Boston in a very real fashion for a little while." With the last of the letters, Irene had enclosed her photograph. It showed how pretty she was, he told her, and promised her he would carry it with him everywhere and "show it to every Frenchman, lizard, and butterfly I can buttonhole." He apologized for not calling her before he left the United States; he'd felt miserable, he wrote, and knew he'd have "broken down" had he called. Now, a week out, he was

"feeling much better and…remembering all the happy hours and days we had together and forgetting the really few hours of sadness [when they separated]." Then he had to break away from letter writing—there were French scientists walking around the table where he was writing, and it made him self-conscious. He quickly signed off, "All my deepest love."

His days fell into a routine: up at 6:00 a.m.; fruit, coffee, and bread for breakfast at a small French restaurant near his edge-of-town hotel; then off to what he called a "little patch of forest" at Le Chapeau Gendarme, a peak shaped like a French policeman's cap in a ridge of mountains behind Nouméa, for a day's work observing and collecting. Reviewing his life many years later, he celebrated his good luck: "At the time I entered college only about a dozen scientists around the world were engaged full-time in the study of ants. I had struck gold before the rush began. Almost every research project I began thereafter, no matter how unsophisticated (and all were unsophisticated), yielded discoveries publishable in scientific journals." New Caledonia was only the beginning.

The highlight of his exploring there was a climb to the summit of Mount Mau, at 469 meters (about fifteen hundred feet) the third-highest peak in the country. The climb itself, he wrote Irene, was "a stiff little hike, very hot and wearisome," but at the top he found cloud forest, "a weird and wonderful world of little twisted trees covered with thick moss and epiphytes [air plants], and various weird little plants growing on the moist, mossy forest floor." Clouds limited his view—he could see no more than fifty feet in any direction—but what he saw was magical:

> It was truly a lost world, hardly ever visited by humans, in its primeval state, and utterly unlike any other kind of forest you see in the lowlands. I picked up at least one new species of ant and saw a brilliant green parrot, who sat on a branch about 15 feet away and squawked at me…. In the West Indies this kind of forest is called "elfin forest" because of the funny little twisted, moss-covered trees.

Wilson continued day-collecting in New Caledonia through Christmas and New Year's, adding to his list of new species and adjusting to the tropics. In Nouméa there were "absolutely no signs of Christmas decorations in the stores," he marveled. For the French, Christmas was for children, New Year's for adults. Santa Claus was supposed to arrive by French submarine, but could only muster an old tugboat; he was greeted anyway by an enthusiastic crowd of more than a thousand people, "including many children and fascinated New Caledonian natives and Indochinese and Malayans." At the American consulate's picnic on Christmas Day, everyone gathered around as the visiting young Harvard entomologist, whether sober or otherwise he doesn't say, "tried to climb a coconut tree (nobody else would dare); I got halfway up and pooped out, and came down with only a couple of scratches for my troubles." All in all, it had been "the strangest Christmas I ever hope to spend."

Taking a break at the beach one afternoon, he noticed a few of the new bikini-style swimsuits, named after the site of the first postwar U.S. atomic-bomb tests, conducted twenty-three hundred miles north, on Bikini Atoll. He hastened to assure Irene that most "colonial French are extremely conservative in dress and manner." He dived the reef, using a newfangled "snorkel" and fins, tried to catch a fish by the tail, hoped to see a shark one day, "but none of this riding-on-the-shark's-back-for-sport for me." He'd made a crowd of friends; he sent Irene for safekeeping a list of twenty-five names, ranging from three fellow entomologists, two French and one New Zealander, to the secretaries at the American consulate, to the workers at the little French restaurant where he ate his meals, to an Australian filmmaker. From their perspective, he was the exotic.

Early in the new year, investing a week on behalf of both "curiosity and opportunism," Wilson diverted to what he called "just about the most remote spot on earth which you can reach by the usual airlines," the island of Espiritu Santo, then an unusual jointly administered British-French condominium, 480 miles north-northeast of New Caledonia. "Santo is the real tropics," the young traveler informed his fiancée, "and vastly different from New Caledonia. Hotter, wetter, lusher. And a more interesting place I have never

seen." Although the island was only about forty miles wide, its extensive and largely undisturbed rain forest would feed his curiosity; that ants had never before been collected there for scientific study would gratify his opportunism, since every data point he added to his notebook would be new.

Luganville, where he arrived, was the only town on the island, Wilson told Irene, "nothing more than a scattered string of stores & houses, mostly in old U.S. army Quonset huts." He had arranged through a friend on New Caledonia to stay with a prosperous French planter family, one of the wealthiest of some two hundred families on Espiritu Santo who grew coconuts for their copra (the dried meat, from which coconut oil is pressed).

The Ratards—Aubert and Suzanne and their two teenage sons—welcomed Wilson to their substantial plantation. It was "something out of a storybook," he wrote, conveniently located near virgin rain forest. "There are 70 natives here in a village next to Ratard's house; they were brought from the Banks Islands, and though they are very well taken care of and of course completely free, the whole setup is like Tara out of *Gone with the Wind.*"

A Georgia plantation was an understandable association for a Southerner to make, but the book the Ratards had been celebrated in was a more recent fiction, James Michener's 1947 novel *Tales of the South Pacific,* the basis for the hit 1949 Rodgers and Hammerstein musical *South Pacific.* Over dinner one evening, Ratard identified himself to Wilson as the model for Emile, the French planter in *South Pacific* who falls in love with the American navy nurse Nellie Forbush, and recalled Michener's visits as a young navy officer during wartime. Michener himself, on a later return, would remember Madame Ratard's roast chicken and good French wine and "a betel-chewing [Tonkinese] woman with a profane vocabulary [who] struck my fancy and became the character Bloody Mary in my novel." Ratard, he added gratefully, "got me started as a writer."

Ratard told Wilson that the real Bloody Mary still lived on a nearby island, Éfaté. Later, the planter walked Wilson down to the shore of his property to show him Bali-ha'i, "across the Segond Channel," Michener had written, "in real life the island of Malo."

Madame Ratard served the best food Wilson had ever enjoyed in his life, he told Irene, "an experience to be remembered, from seafood entrees to delicious tropical fruit ice cream."

The Ratards' sons drove Wilson and a native assistant from the family plantation to the rain forest each morning and picked them up again for dinner and supper. The assistant chopped down trees so that Wilson could study the arboreal ants that lived in the forest canopy —"*real* rainforest," he emphasized, "with giant trees, very dark floor, etc. Gorgeous little parrots and pigeons fly around in the treetops, and in the evening flying foxes, giant fruit-eating bats with wingspan about 3 ft., fly leisurely overhead. Flying foxes are considered a delicacy here and Mme. Ratard has promised to serve one up before I leave." His collecting was going well, he ended the Saturday-evening letter, "new species right & left."

Monday, 10 January, Wilson worked again in the rain forest, "picking up ants and batting off hordes of voracious mosquitoes and flies." The insects would drive him "crazy," he thought, if he had to spend more than a week working there. His first bout of tropical dysentery slowed him down that day; he "quickly drowned it in sulfaguanidine" and it was nearly over by evening. He was learning a little Melanesian Pidgin, the reduced regional language shared between natives and Europeans in an island world where hundreds of local languages were spoken, to mutual incomprehension. Pidgin for "piano," he'd been told, perhaps facetiously, was "big box he got white teeth you hit he sing-sing." The funniest he'd heard was the Pidgin for violin: "Little box you scratch him on belly he cry."

However crazy the mosquitoes and flies might make him, Wilson retained enough wit to generalize from the ant varieties he found on Espiritu Santo to a larger understanding. The species he collected, he wrote later, were "Melanesian, as expected, Solomon Islands most likely, hence ultimately Asian. I made a general observation on the ecology of these insects that would find a place in my later synthesis of island evolution." He had noticed the relative scarcity of ant species on Espiritu Santo; it was, he realized, "just too distant and geologically young to have received many immigrants." As a result of this reduced competition, some species had greatly expanded their niches, densely

populating "a wide range of local environments and nest sites." This phenomenon he would later name "environmental release." It was, he realized, "an important early step in the proliferation of biodiversity."

Then a real tropical fever laid him low—"clobbered" him, he told Irene, with a sore throat and a temperature of 103 degrees. The fever broke on Wednesday, though he was "still a little wobbly" as he drafted the midafternoon letter. He doubted if he'd get any more fieldwork done, since the weekly flight to Nouméa left early Friday morning. "I'm discovering that ailments of the sort which give you minor distress in the States can knock you out in the tropics. While I was uncomfortably sick two things kept running through my mind," he concluded gallantly—"You and the music of 'Swan Lake.' The thought of you made me feel quite happy and secure." He enclosed an orchid he'd picked for her. Inevitably, it arrived in ruins, but the thought counted.

Wilson still hadn't tasted flying fox, the big fruit-eating bat of the Santo rain forest. Locals had collected three of the animals on Sunday, and that evening, Wilson had helped clean them of parasites. Madame Ratard had put the local delicacy on the menu for Monday's dinner, which he'd missed because of his fever. He tried warmed-over flying fox Wednesday night, but he was no South Pacific gourmet: "It was terribly rank and gamy," he told Irene, "tasting just about what you'd expect from bat meat, and I couldn't get down more than 2–3 bites."

On Friday morning, 14 January 1955, feeling fit again, Wilson caught the return flight to Nouméa. He found a month of Irene's "beautifully written" letters waiting for him, including a portrait photograph of her that he pledged to keep "sitting in front of me at all stops" and a collection of *Li'l Abner* comic strips, a favorite of his with its Southern setting and perhaps also its barefoot young hero, a hillbilly Candide.

And then, after a six-hour flight from Nouméa on Sunday, he arrived midafternoon in Sydney, Australia, "settled in a comfortable hotel in the downtown section near the Sydney Harbor Bridge," and "at suppertime…went out and had my first Chinese dinner in 6 weeks." (Chinese dinners, savory and inexpensive, had been a favorite of the dating couple in Boston.) The Sydney streets were filled with

couples strolling hand in hand on that warm January night of antipodean summer, "and believe me," he told Irene, "I ached for you."

The first leg of Wilson's South Pacific expedition had been a great success. "I mailed off the New Caledonian collection to Harvard this morning," he'd written Irene on 5 January, "a real treasure house for future research, over 300 separate collections, all with field notes. I estimate I collected a minimum of 82 native species here, of which nearly half are new to science."

He felt deep gratitude for the opportunity Harvard had given him: "Seldom does a biologist, and especially a young one, get to travel like this to all of the significant rainforest areas. I'm stacking in loads of valuable experience that will temper all of my future research and writing." He elaborated on that theme later: "Ideas in science emerge most readily when some part of the world is studied for its own sake. They follow from thorough, well-organized knowledge of all that is known or can be imagined of real entities and processes within that fragment of existence."

To Irene from Sydney he reported successfully connecting with his Aussie counterparts, both professional and amateur. She had worried that his single-minded intensity could be socially isolating. "I have made friends faster during my Australian visit than ever before in my life," he reassured her, "partly I think because I seriously wanted to make friends here, as many as possible." He was, he added, "carrying through my threat to get along better with people." With its touch of defensive irony, his "threat" sounds more like a pledge his fiancée had drawn from him.

Wilson's primary purpose for visiting Australia was to find an ant of the greatest rarity, the dawn, dinosaur, or living-fossil ant, *Nothomyrmecia macrops*,* previously collected only once, in the winter of 1931–32, and never studied in the field. To that end, he would join a trio of collectors in the South Australian town of Esperance on the last week in January, to search the dense mallee-eucalyptus scrub eastward, where the ant had been found two decades earlier.

Ants (and wasps and bees) are believed to have evolved from parasitic wasps, which attack and paralyze hidden prey and lay their

eggs in or near their preys' hideouts as food for wasp offspring. (A more evolved modern form are the familiar mud-dauber wasps, which make the Pan's-pipes-like mud tubes that show up attached to the exterior walls of buildings. Mud daubers paralyze prey, pack it into tubes to feed their larvae when they hatch, and cap each arrangement with an egg.) It's easy to see how this behavior might evolve into the more complicated, specialized, and successful group behavior of the social insects, which lay eggs in subterranean channels or tubes of wax or paper and feed the larvae there, but with one or more queens doing all the egg laying, and specialized workers caring for queens and young while others defend the colony or collect food.

Nothomyrmecia, a genus with only one known species, was thought likely to be less specialized than more evolved types; its workers collect prey individually and return it to the colony individually rather than passing it back or carrying it back cooperatively: the dawn ant had not yet evolved trail laying. It was, Wilson wrote Irene, "the most primitive of all ants, and its rediscovery would be an important scientific event. We hope to be lucky enough to study it alive in the field." If they were so lucky, they'd be far ahead of their most recent predecessor, Wilson's Harvard mentor Bill Brown, who had searched the area around the town of Esperance and nearby Mount Merivale four years previously without luck. Wilson's renewed hunt was a good example of his collection strategy: planning broad searches to amass a large number of new species, but going for the rare and spectacular as well when the opportunity arose.

After only a day and another night in Sydney, wasting no time, the eager young entomologist flew on to Adelaide, South Australia's coastal capital, and from there to Kalgoorlie in the Australian Far West, a total distance of 1,747 miles (2,812 kilometers). Beyond Adelaide, "the vast…Nullarbor Plain over which the transcontinental railroad runs" impressed him, he wrote Irene, "very flat and very brown." Kalgoorlie reminded him of a small town in Kansas or Oklahoma, pleasant and welcoming. From there he would travel by air and by train almost due south to Esperance, on the south coast, stopping halfway down, in Norseman, "a sunbaked little town," to look for *Nothomyrmecia* alone.

But despite Wilson's best efforts, and those of the three Australian colleagues who joined him in Esperance when he arrived there on 22 January 1955, they found no dawn ants in any of the places where they looked across the next weeks. In the Thomas River basin, their primary search area, they collected both by day and by night, excavated and swept, but *Nothomyrmecia* eluded them. Another twenty-two years would pass before an Australian team would find and study the rare species, a thousand kilometers (about six hundred miles) east of the Thomas River basin, in October 1977. It turned out to be active during the cool antipodean summer season rather than the hot winter season, when Wilson and his colleagues had sought it.

Returning from Esperance, Wilson serenaded his fiancée with an ode to Australia that celebrated his delight in wilderness:

> What a country! Hundreds and hundreds of miles of rough little roads and byways without a habitation along them or even an advertising sign now and then, just tens of thousands of square miles of eucalypt forest and sandplain, from the coast inland to the central desert. Leaving Norseman and heading east, you don't encounter another human (except for a rare passing car) for 186 miles, when you reach Balladonia, with three or four whites and a few aborigines. Then you can turn south, and go for 150 miles or thereabouts to the coast at Thomas River, passing only one lonely sheep station, whose owner is half aborigine and spends much time bush-roaming and tracking dingos. And this is not desert—most of it is covered with fairly tall timber. No wonder Australia is appealing for more immigrants. It's great to see at least one country that isn't overcrowded.

All in all, Australia had been "much more profitable experience-wise than I anticipated," Wilson wrote Irene on 21 February from Perth, as he prepared to fly north, to the largest island in the Pacific. "But now I'm rarin' to get to New Guinea, one of the last and greatest strongholds of stone-age man and the primeval forest and my premier destination on this trip." He might have been traveling backward in time: he'd found no dawn ant in rapidly modernizing Australia, and

though he'd looked all over for a boomerang, he couldn't buy one anywhere.

Australia had administered much of long, bird-shaped New Guinea since 1949 as the Territory of Papua and New Guinea; a last-minute seat on a Qantas flight carried Wilson to its capital, Port Moresby, early in March 1955. He was struck immediately by the less Westernized conditions, he wrote Irene, even in the capital; nearly all the men had "ceremonial scars on their bodies, they stare at you in the street, and (ahem) the women are hardly dressed at all in some cases." He told his fiancée he expected his fieldwork to be "the most exciting of my life." The mountains were "real mountains, many towering over 10,000 ft., the forests are vast and primeval and largely unexplored on foot, and the people are almost a nation unto themselves, over a million strong, with many different customs and languages…. Just seen from Port Moresby, New Guinea has a quality of bigness, primitiveness, and natural savagery that I've never encountered before. It's a world by itself, and you could spend a lifetime exploring it…. I think I'm going to like the place."

New Guinea has supported human settlement for at least forty-two thousand years. Its interior is so broken up by mountain ranges, dividing and isolating its many indigenous populations, that its people speak no fewer than 851 languages—more than the peoples of any other landmass on Earth. No larger political entity had connected its tribes until the Australians arrived under United Nations auspices at the end of World War II; its Hobbesian anarchy had manifested itself in a homicide rate of as much as 1,000 per 100,000 population, the highest in the world. (The U.S. homicide rate in 2017 was 5.3 per 100,000; the British, 1.2 per 100,000.) The sexes lived sharply divided lives, the men hunting with bows and arrows but seldom sharing the small game they shot (the largest native mammal on the island was a possum-sized marsupial, the cuscus). Women were thus forced to live almost entirely on roasted sweet potatoes, large spiders, and grubs. As a consequence, in the Eastern Highlands around the turn of the twentieth century, women had begun eating their dead in secret feasts, a practice still common at the time of Wilson's visit. Such gourmet cannibalism, recycling brain tissue contaminated with an unidentified

organism, resulted in the appearance of a disease that the Fore people of the Eastern Highlands called *kuru,* meaning shivering or shaking. A parallel outbreak in England in the 1990s among cattle that were fed recycled meat-and-bone meal containing contaminated nervous tissue would take the name "mad cow disease." Wilson collected well to the northwest of the *kuru* outbreak areas during his time in New Guinea, and makes no mention of the disease in his records, but the mysterious epidemic and the cannibalism that spread it indicate just how undeveloped the country was.

From his first camp—inland from Port Moresby, on the Brown River—Wilson wrote Irene on 9 March that in the New Guinea rain forest he had reached his "final destination, the place I've dreamed of…. My camp is pitched right in the heart of it—giant trees festooned with leaves are on all sides, their green canopy shutting out nearly all light…. Every level teems with life—the racket made by parrots and other birds, frogs, and insects, beats on the ears day and night. Vines, tree trunks, and rotting logs almost crawl with an endless array of insect species, including ants, which keep me hopping around enthusiastically." Many of the ant species he encountered "live[d] in silk bags hung from the sides of trees or leaves, and there are army ants here with legions of hundreds of thousands of workers." Rain forest, he concluded, was "the forest primeval…ageless and the cradle of all life." Too much life, it seemed; "the excessive heat & humidity, especially at midday," thickened the air, air truculent with "endless, enormous, aggressive, consuming hordes of mosquitoes that are after you every minute of the day. The mosquitoes are the most fatiguing part of daily life here; if they would vanish then it would be a pleasant place to live."

As for living, Wilson wrote, he had four assistants, called "boys" in Pidgin, "a cook-boy, a laundry-boy, a driver and shoot boy, and a general flunky, each being paid 22–33¢ a day plus rations. I've never had it so good—my only problem is finding things to keep them busy, and then struggling with Pidgin English to get my orders across. They've already built me a bed, table, stockage, and fireplace, enough to keep us going 4 months instead of the actual 4 days we'll be out here." Puckishly, he promised Irene to try "not to get spoiled with all

this service, so I'll be sufferable when we're married, and I promise never to get up in the morning and shout at you 'Kaikai, you bring 'em, 'e come.' ('Bring my breakfast.')" Back in Port Moresby, on 11 March, he reported with satisfaction that his Brown River camp had offered "just about the richest collecting for a similar period I have ever had; I calculate I collected over 50 species during 3½ days, many of them undoubtedly new."

After two busy weeks in the Port Moresby area, collecting, organizing, and annotating specimens and shipping them back to Harvard, Wilson flew to Lae—due north 188 miles, on the opposite coast—planning to explore inland from there. A week at a lumber camp allowed him to collect and study arboreal ants from the rainforest heights. But a more exciting prospect had opened: a young Australian agricultural officer, Bob Curtis, had invited him to join a monthlong expedition into the Finisterre Mountains, "an expedition of the old tradition, into one of the most rugged, least known parts of the world." Curtis was staging the expedition out of Finschhafen, a harbor town sixty miles east of Lae with a European population of twelve, and on 30 March, Wilson moved there to join him. Curtis told Wilson they would have about twenty carriers, "a new batch picked up at each village…just the sort of thing you see depicted as jungle-traveling popularly in cartoons & the cornier Hollywood movies, Curtis & I at the head, Curtis with gun and me with butterfly net, and a string of carriers behind."

The two young men, Curtis twenty-one and Wilson twenty-six years old, left Finschhafen by truck on Monday, 4 April 1955, crossed the Mape River by canoe, and picked up another truck, which delivered them to the coastal village of Heldsbach. At noon, they departed from Heldsbach in grand style, "with 3 regular native assistants, 1 police boy, and 47 carriers." They passed the Lutheran mission at Sattelberg at four in the afternoon and paused to inspect a scattering of signs the Australian army had left, "marking skirmish points in the area where they drove the Japanese into the mountains in 1944." New Guineans had helped and guided the Aussies in their fight against the Japanese during World War II, one reason Australia was supporting New Guinea's development postwar.

> As I walked back to the village at dusk, the Bulum valley presented a strange and beautiful spectacle. Unbroken forest extended for a thousand feet down to the river and across for nearly ten miles to the Rawlinson range; all was bathed in an aquamarine haze, so that it was like looking down into a deep ocean pool. Cockatoos circled in lazy flight over the treetops like brilliant white fish following the bottom currents. The only sounds I could hear were their faint cries and the distant roar of the river. For me it was a different and very satisfying view of the Forest Primeval.

Four days later, the patrol disbanded in Finschhafen, where Wilson found a letter from Bill Brown reporting that the collections he'd already sent to Harvard were a great success, and "even if you quit this minute, the collection so far is well worth all the cash ladled out."

A greater benefit of the months of travel and work, Wilson wrote Irene, was "a brand new theory" he had conceived during the inland patrol "dealing with the distribution and evolution of animals in the rainforest." He would work on that theory for another year before publishing a major paper in 1958, one of his first contributions to theoretical biology.

In May, shortly before he left New Guinea, Wilson had a second chance to scale the summit ridge of the Saruwaged Range. This time he made it, "the first white man to go to the top of the central portion of the range," he wrote Irene, "and the first to walk up the upper Bumbok valley." The climb was doubly exciting, he elaborated, because he was the first recorded climber of the mountain group of whom he was aware, and because he went through unexplored territory to get there:

> There are very few places left in the world where you can do that. It was a *rugged* trip—the toughest I've ever made. Five days walk to the top (12,000 ft.), the last four by little-used native hunting trails over unimaginably rugged country…. Even my guides, recruited from the last native village in the Bumbok, got lost a couple of times. The trip was crowded with events right out of a storybook: uncertain weather making the final climb doubtful but staying clear on the fifth day, natives hunting kangaroos on the

summit with bows and arrows, etc. You'll see some of it yourself if the roll of Kodachromes exposed on the climb turn out. These shots are real *National Geographic* stuff—the first color photos from inside the Saruwaged.

He was still tired, but contented. The climb, he concluded, "really [made] my New Guinea tour complete."

Nothing of his work across the next four months would compare to New Guinea, Wilson told Irene in a 4 June letter. "The major part of the trip is now over. There are just 3 other short phases—Queensland, Ceylon, & Europe—all of which are like cleaning-up operations and should move quickly, I hope." He was feeling lonely on that Saturday night in Lae, wondering what his fiancée was doing halfway around the world in Boston, "and how happy we'd be if together there now, even just on weekday nights and Sunday afternoons—strolling, working in the lab, planning a weekend away…. Our first year will be exciting in so many ways." He listed some of those ways, anticipation blunting loneliness, "a completely new world for both of us."

Leaving New Guinea, Wilson flew to Sydney, where in mid-June he sailed on the Italian liner *Toscana* around the south end of Australia to Ceylon. (A British colony at the time, Ceylon became a republic, Sri Lanka, in 1972.) He collected on that green teardrop that hangs off the southern tip of India for three weeks, finding 130 species before boarding the liner *Australia* at the end of July for a five-week voyage to Genoa, Italy. "This trip is fairly racing to the end," he wrote Irene before he sailed, adding parenthetically, "(I've started counting *days* now)."

Much of Wilson's time aboard ship he spent reading in the humanities, a deliberate course of self-improvement. In Perth, he'd acquired a dozen Penguin paperbacks with titles ranging from *Psychiatry Today* to H. D. F. Kitto's *The Greeks.* Psychology fascinated him; it was, he wrote Irene, "perhaps the most powerful single subject I've ever encountered outside of my cherished evolutionary theory. It's fascinating just by itself, but [also] offers a key to the understanding of a multitude of other, difficult subjects." Most "modern writers," he

observed astutely, "who are attempting a critical survey of their special subject use modern psychological theory as one of their principal tools," citing as examples the art historian Herbert Read, the anthropologist Margaret Mead, and his older Society of Fellows colleague Crane Brinton, a historian of ideas.

Wilson thought he fit Brinton's definition of "a mild 'anti-intellectual,'" although Brinton's concept of this category of thinking made it "very honorable. The 'anti-intellectual' approach is really anti-pure-rationalist," Wilson clarified, but he thought "anti" was an unfortunate label, "which I'll have to discuss with him back at Harvard." The "anti-intellectual," as Crane defined him, Wilson explained, "recognizes the tremendous influence of the unconscious mind and conditioned reflex on human thinking, and the great inertia of ethical behavior. He doesn't believe man can be changed in a generation by rationalist schemes, and therefore tends to be, among other things, anti-communist. He is a conservative among intellectuals, and by some to the left might even be called reactionary." Other than Brinton's "anti" label, Wilson found the characterization compatible, although it hardly encompassed his considerable and rapidly enlarging intellectual range. Being labeled reactionary was a traumatic burden he had not yet been forced to bear. The time would come.

Through August 1955, Wilson worked at museums in Genoa, Paris, and London, comparing his South Pacific discoveries with specimens collected there as long as 160 years ago. From London, on 30 August, he summarized for Irene the significance for them as well as for others of the ten-month odyssey she had understandably called a "nightmare":

> The 1,000 species I have collected personally on this trip, plus the several exchanges engineered with other museums, are adding tremendously to our collection at Harvard and strengthening it as the best of its kind in the world. I'll always be able to draw on it for unlimited research material, even if and when we leave Harvard. Actually, on this trip I've laid a firm foundation for years of important research, both for myself and others. The benefits will just begin after I've come home. Wait 'til you see the collection

—you'll be amazed at the stuff your fiancé has gathered round the world.

Through the first days of September, to the couple's increasing frustration, airline flights from London to the United States were sold out, filled with homecoming tourists, but sometime after 7 September, Wilson flew to New York and caught the train up to Boston. "Finally," he wrote later, "clad in khaki and heavy boots, crew-cut, twenty pounds underweight, and tinted faint yellow from the antimalarial drug quinacrine, I fell into Renee's arms." ("Renee," pronounced "RE-knee," was Wilson's pet name for his fiancée.)

On 30 September 1955, Edward Osborne Wilson and Irene Kelley were married in the colorful old Roman Catholic church of Saint Cecilia's Parish, in Boston's Back Bay, built in 1894. The wedding was simple. Irene's parents attended, as did Wilson's mother and a few friends, but no bridesmaids or best man. "We both just wanted to get married and get on," Wilson told me. By then, Harvard had offered him an assistant professorship. The Wilsons bought a house in Lexington—west of Cambridge, in the direction of Walden Pond—and began a marriage that has lasted a lifetime.

Once, he had been happy to be entirely alone. In nature he had found "a sanctuary and a realm of boundless adventure; the fewer the people in it, the better." Wilderness for him then was "a dream of privacy, safety, control, and freedom." Those had been the years of his difficult childhood and young adulthood, when he grew into science and mastered the practice of his abundant field.

Skip Notes

* Although it takes a little effort to learn Latin binomial names, they identify species more precisely than common names, which (as here) can vary informally. Emphasis in pronunciation usually falls on the third-to-last syllable, thus "no-tho-mir-MECK-ee-uh," the name of the genus, and "MAK-rops," the species name.

2

Lost Worlds

In a deep south burdened with history, Edward Osborne Wilson, Jr., born in Birmingham, Alabama, on 10 June 1929, traced his roots back through a government accountant, a river pilot and Confederate veteran, a New England furniture maker, a marine engineer, and generations of farmers. All his immediate ancestors had been Georgians and Alabamians, almost all Southern Baptists. None were college graduates, not even his father, the accountant, who had learned his trade in the United States Army in the years after World War I. Young Ed—"Sonny" to his family—was an original.

A knot of Wilson's earliest memories dates from his seventh year. In the summer of 1936, he was allowed to spend his days wandering alone on a beach on a bell-shaped point of land at the mouth of Perdido Bay, on the Florida-Alabama state line, fifty miles southeast of Mobile. He recalls uncommon events from that summer in his 1994 memoir, *Naturalist:* a young man walking by with a revolver who told him he was out to shoot stingrays; porpoises playing close offshore; a shadowy ray much larger than the common kind, which he tried to catch with a big hook baited with pinfish left dangling off the dock at night but always found stripped bare the next morning. But two crucial encounters he freights with emotions more intense than simple curiosity. One was an alien visitation. The other was an accident.

"I stand in the shallows off Paradise Beach," Wilson begins his description of the alien encounter, "staring down at a huge jellyfish in water so still and clear that its every detail is revealed as though it were trapped in glass. The creature is astonishing. It existed outside my previous imagination." He describes it: "Its opalescent pink bell is divided by thin red lines that radiate from center to circular edge. A

Wilson's mother was awarded custody when his parents divorced. She could not yet support him, however, so his gambling, chain-smoking, alcoholic father took charge. His father's work—auditing rural electrification programs—was itinerant; the boy and his father lived in boarding houses until Ed Senior remarried. After that, Wilson recalls moving among "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." Across nine years, from fourth grade to high-school graduation, he attended fourteen different public schools.

"A nomadic existence made Nature my companion of choice," Wilson writes, "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." After mustering out of the Gulf Coast Military Academy in the summer of 1937, when he was eight, the boy was again farmed out, this time to a family friend, a surrogate grandmother he called Mother Raub. He lived in Pensacola with her and her husband, a retired carpenter, throughout the school year. He skipped a grade that year, which made him "the runt of my class," and found himself fighting off bullies and growing shy and introverted. He recalls being "just as happy to be entirely alone. I turned then with growing concentration to Nature.

Wilderness adventure was popular in an era when radio and motion pictures were just emerging, and when photography had begun to illuminate the world of magazines and books. Wilson thrilled to the exploits of the zoo collector Frank Buck in RKO Pictures' *Bring 'Em Back Alive* ("I don't kill 'em—I bring 'em back alive!"). He read Arthur Conan Doyle's 1912 thriller *The Lost World,* in which a group of explorers discover an elevated plateau deep in the Amazon jungle where living dinosaurs and ape-men roam. The leader of the group, a brilliant, cranky zoologist named Professor George Edward Challenger, tutored a small savage in exploration. "It was my business," Challenger tells the novel's journalist narrator, speaking of an earlier Amazon exploration, "to visit this little-known back-country

and to examine its fauna, which furnished me with the materials for several chapters for that great and monumental work upon zoology which will be my life's justification."

In 1938, young Ed's father and his new stepmother, Pearl—"a country lady from King's Mountain, North Carolina," Wilson calls her—collected him and moved to Washington, D.C., where Ed Senior was taking up a two-year assignment at the Rural Electrification Administration. Now nine years old, the boy had become a dedicated reader of *National Geographic* magazine, the gold standard of wildlife and wilderness reportage. Its articles exposed him to the world of insects, "big, metallic-colored beetles and garish butterflies, mostly from the tropics." He was memorably inspired by a report in a 1934 issue, "Stalking Ants, Savage and Civilized," by the director of the nearby National Zoo, W. M. Mann, luridly subtitled, "A Naturalist Braves Bites and Stings in Many Lands to Learn the Story of an Insect Whose Ways Often Parallel Those of Man."

Mann described the Formicidae in all their astounding variety, from "ants as savage and ruthless as the ancient Huns or Mongols," to ants that "make their own gardens and grow their own special food…. Ants that keep 'cows'; others that gather and store honey in barrels made from living nest-mates." A suite of full-color paintings illustrating the story included a battle scene captioned "red amazons with ice-tong jaws deal death in a kidnapping raid."

Mann's article, Wilson writes, "led me to search for these insects." He dreamed of prospecting in faraway places. That would come; in the meantime, the one faraway place available to a nine-year-old beckoned only blocks away from his family's basement apartment at Fourteenth and Fairmont. Washington's Rock Creek Park, authorized in 1890 as the nation's third national park, opened three square miles of wooded landscape in the heart of the capital. In a 1918 report, its architects describe "large stretches of forest, [a] river valley, dark ravines, steep and rolling hills, and occasional meadow lands"; to a small boy come north from the Alabama semi-wilderness, it was first of all an insect cornucopia.

There young Ed ventured on expeditions. "Insects were everywhere present in great abundance," Wilson recalls. "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." The National Museum of Natural History was within easy range as well, a nickel streetcar ride away, and the National Zoo that Mann directed was almost next door, at the head of the park. Both were free and open seven days a week.

"I was catching these big, accidentally introduced Chinese green mantises," Wilson told me. "They were all over the place. Still are. I wrote stories about them in the sixth grade. My parents got a report card about me and my stories which said, 'Ed is doing well. He writes well and he knows a lot about insects. If he puts those two things together, he might do something special.' Yes. That can't have hurt."

That year, young Ed acquired a new best friend and fellow explorer, Ellis MacLeod, a boy a year older who lived down the street and went to the same school. The two boys attended sixth grade together. MacLeod was a butterfly collector; when he heard that Ed also collected butterflies, he sought him out to tell him he thought he had seen a red admiral in the park. A striking black-winged butterfly with white spots near the tips and red median and marginal bands, *Vanessa atalanta* occurs throughout North America and down into Mexico and Guatemala as well as worldwide, adults living on tree sap, fermenting fruit, and bird droppings. The two boys searched the park together, but the red admiral had moved on.

Then, in a further imprinting, young Ed exposed a mystery as compelling as the astonishing opalescent-pink sea nettle had been. "About this time," Wilson recalls, "I also became fascinated with ants." Exploring the park one day with MacLeod, clambering down a steep, wooded hillside, he pulled away the bark of a rotting tree stump "and discovered a seething mass of citronella ants underneath." Citronella ants live underground and in decaying wood; the worker ants young Ed exposed "were short, fat, brilliant yellow, and emitted a strong lemony odor." Years later, Wilson would report on the source and function of the odor, a compound of citronellal and citral emitted from glands in the ants' mandibles that serves as an alarm substance and a weapon when the colony is disturbed. "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?" These questions echo the boy's earlier curiosity about the ocean depths from which the sea nettle had emerged.

Ed and Ellis spent hours wandering the halls of the National Museum, Wilson writes, "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." But their museum explorations opened a larger view as well, Wilson remembers:

> 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…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.

"My future was set," Wilson concludes. "Ellis and I agreed we were going to be entomologists when we grew up." (Ellis MacLeod went on to a lifetime career studying green lacewings and teaching entomology at the University of Illinois. He died in 1997.) Both boys were focused at that time on butterflies. When young Ed returned with his family to Mobile in 1941, he enlarged his butterfly collection with the rich new fauna of the Gulf Coast: "snout butterflies," Wilson reminisces, "Gulf fritillaries, Brazilian skippers, great purple hairstreaks, and several magnificent swallowtails—giant, zebra, and spicebush." With a sweep net fashioned from a cone of cheesecloth, a hooped coat hanger, and a length of broom handle, he could see and capture butterflies well enough. But ants continued to push their way into his awareness. In the summer of 1942, when he was just thirteen, a discovery he made in a vacant lot next door to his house introduced him to the rewards of systematic work.