Insectopedia

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For my mother and father,
for my sisters,
for the insects, for their friends,
and, of course,

For Sharon

Kafka

Now I am ready to tell how bodies are changed
Into different bodies.

TED HUGHES, *Tales from Ovid*

1.

We know this story. A solitary *Ammophila hirsuta* captures and paralyzes a larva of the turnip moth, *Agrotis segetum*. She drags it to her nest, lays an egg on its soft belly just beyond reach of its feebly waving legs, and exits, barricading the entrance to the burrow behind her. The egg hatches, and the emerging wasp larva at once starts to feed. It grows fat and strong. The caterpillar, unable to move with force but still discerning shape and shadow, sensing atmospheric and chemical changes, and experiencing pain, is slowly consumed, first the nonessential tissue, later the vital organs.

2.

This morning, I read that less than 1 percent of caterpillar eggs survive to adulthood. Such is the ferocity of the predators they face: the birds, reptiles, and mammals (large and small); the parasitoid wasps and flies, the ants, spiders, earwigs, and beetles; the viruses, bacteria, and fungi. Not to mention the gardeners. This state of affairs accounts for the caterpillars' spectacular battery of defenses: toxic flesh, chemical sprays, aggressive sounds, spiny bristles, garish coloring, biting mouths, silky escape ropes, unpleasant fluids regurgitated, repellant odors diffused, the precision mimicry of eyespots, horns, faces, and camouflage, the barbed hair, the stinging hair, the intimidating postures, the alliances with ants.[1]

Still, less than 1 percent survive to adulthood, to that moment when "with a reckless smile," as Roberto Bolaño put it, they emerge anew.[2]

3.

Less than 1 percent survive to adulthood? It must be difficult to establish this fact with confidence when there is no reasonable estimate of numbers to begin with and when each caterpillar instar—each larval stage, of which there are often five or six before pupation—can look quite different.

In short, consider the difficulty of establishing this statistic with confidence when caterpillars, as the ecologist Daniel Janzen recently pointed out, "are the last unknown group of big things on the terrestrial world."[3]

4.

One claim, two problems: the problem of quantifying survival and the problem of conceptualizing adulthood. If the first problem is insurmountable, the second is harder.

The textbooks explain that a caterpillar is a Lepidoptera larva, the stage in the life cycle of a butterfly or moth between the hatching of the egg and the formation of the pupa. It is the stage that leads to metamorphosis and the adult form, the stage during which some animals increase their mass a thousandfold and repeatedly molt as they travel through their various instars.

Jules Michelet, the historian and naturalist, considered the ways in which this extended journey of the insect from one state to another might parallel the passage of other animals "from the embryonic existence to the independent life." Unlike mammals, he wrote in *L'insecte* in 1857, for pupating insects "the destination is not merely different, but

contrary, with a violent contrast." This "is not a simple change of condition," and these are not "the gentle manoeuvres" by which the rest of us achieve maturity. These beings that are one and the same could not be more different: clay-footed yet ethereal, earthbound yet aloft in the skies, scurrying to the shadows yet drawn to the light, a grinder of leaves yet a sipper of nectar, unencumbered by genitalia yet dedicated to sex. "*The legs will not again be the legs. . . . The head will not be the head,*" wrote Michelet. This transformation, he saw, "is a thing to confound and almost to terrify the imagination."[4]

Michelet no doubt knew that the word *larva* had entered the Romance languages accompanied by older, darker associations. In a time of meaningful correspondences between natural phenomena and everyday life, an age when people discerned potent signs in stones and storms, the word *larva* conjured disembodied spirits, ghosts, specters, and hobgoblins, and it seized on its insect in a fit of recognition. The duality of the word expressed the occult ambiguity of the creature. It was Linnaeus who insisted on the restrictive modern meaning of the term and, with that shift of logic and sentiment, began the textbook entry that still stands between us and the uncanny reality of the thing.

Here is the larva and there is the adult. For Michelet, author of a celebrated seven-volume *Histoire de la Révolution française,* the event that lies between these states of being was a "revolution," an "astonishing tour de force.'[5] It was perhaps possible for Linnaeus to disenchant the word but quite another matter to pacify the thing itself.

5.

As stubborn as its goblin nature was the idea—still with us—of the larva as a mask behind which lies the animal's truth. One being enters the chrysalis. Another comes out. "All is thrown aside with the mask," said Michelet. "All is, and ought to be, changed."[6]

Michelet was fifty-nine when he published *L'insecte.* He would live for another seventeen years, but he was nonetheless already preoccupied with death. His massive works of history were works of resurrection, of bringing back to life. And, indeed, the dead were always around him.

When he was seventeen, his mother died. Six years later, it was his closest friend. When he was forty-one, his first wife died. Seven years after that, it was his father, with whom he shared a house. At fifty-two he lost a baby son, the only child of his new marriage; five years after that, his thirty-one-year-old daughter.[7]

And his health was poor, riven by a series of psychosomatic complaints brought on by his agonized response to the upheavals that shook France from 1848: the February revolution that created the Second Republic and the subsequent imperial reaction under Napoleon III. A believer in the unity of nations, he was horrified by the assertion of class on all sides. But the restoration of the emperor led—as it did for Fabre—to a dramatic reversal of Michelet's fortunes; in his case to his sacking from a prestigious position at the Collège de France and his untimely departure from Paris.[8]

Death was all around Michelet. "I have drunk too much from the black blood of the dead," he had written in 1853. Yet he is still drawn relentlessly to resurrection.[9] And that surely is why he is drawn also so relentlessly to the larvae.

He is unconvinced by the primacy of the butterfly, the assumption that this most seductive of animals is the fulfillment of the caterpillar in the same way that the adult human is understood to be the fulfillment (for better or worse) of the child. Some of that assumption anticipates Darwinian teleology: the emphasis on reproduction as the purpose of existence confirms that the sexually mature form is the only one that counts. Some of that assumption is more generally evolutionary: the logic of immaturity and development, the progression through ever greater, more advanced stages to ever more advanced, more perfect states that would become so deeply lodged in post-nineteenth-century politics, culture, and personal life—even though our experience of politics, culture, and personal life tells us emphatically that there really is no guarantee of directional progress.

But perhaps, suggests Michelet, the lesson of metamorphosis is not teleology but impermanence and its immortalities. "Throughout my life," he writes, ". . . each day I died and was born again; I have undergone many painful strugglings and laborious transformations. . . . Many and many times I have passed from the larva into the chrysalis, and into

a more complete condition; the which, after awhile, incomplete under other conditions, has put me in the way of accomplishing a new circle of metamorphosis." He is a moment in the midst of many connected lives. Occasionally he catches himself making a gesture, an intonation, and feels his father alive inside him. "Are we two? Were we one? Oh! it was my chrysalis."[10]

6.

More than a century and a half earlier, as 1699 rolled over into 1700, financially independent but hardly wealthy, twenty years of marriage and five more of ascetic withdrawal into the mystical Labadist community in West Friesland firmly behind her, twenty-something daughter and Amerindian slaves in tow, the fifty-two-year-old Maria Sibylla Merian, already a noted painter of European insects, rode a donkey through the tropical forests of the Dutch colony of Suriname, "the only European woman who journeyed exclusively in pursuit of her science in the seventeenth and eighteenth centuries."[11]

Merian traveled with slaves, but as colonial travelers go, she was relatively benign, never speaking ill of the natives, bemoaning their vicious treatment at the hands of the Dutch settlers, and acknowledging with unusual candor (though in general terms rather than by name) the locals' substantial contributions to her collection.

Raised in a family of artists and publishers—her maternal grandfather was Théodore de Bry, whose iconic engravings made the New World real for readers of the first European travel narratives—Merian developed an early fascination for nature study that never left her. She began at thirteen with silkworms (another family connection: her mother's second husband's brother was in the silk trade) but was soon preoccupied by caterpillars in general and, above all, by their transformations.

The beauty of butterflies and moths, she wrote later, "led me to collect all the caterpillars I could find in order to study their metamorphoses."[12] It was an eccentricity in a girl, but as with the famous and similarly youthful heroine of the twelfth-century Japanese story "The Lady Who

Loved Worms" (who did not pluck her eyebrows, did not blacken her teeth, who was, indeed, not very ladylike at all), the peculiarity was one of sensitivity and insight that perhaps indicated a philosophical refinement.[13] It proved to be a tolerable eccentricity—despite the dark associations that crawling creatures often carried.

Surrounded by books and artists, Merian had access to a large library of natural history illustration. She collected her own insects and bred their larvae through their transformations, drawing and painting from life. She honed her conventional drafting skills, copying from the leading emblem books, including *Archetypa studiaque patris Georgii Hoefnagelii* (1592), a popular collection of insect engravings executed by Jacob Hoefnagel in the style of his father, Joris.[14] But Merian's times were different, and so was her vision: if the Hoefnagels' incandescent insect universe was dedicated to the revelation of the microcosmic, she occupied a world refreshed by the introduction of the microscope, in which the new preoccupation was with observation and the classifications it made possible. Where Hoefnagel had arranged his insects in a symbolic order, Merian placed hers in a different relation, one that was drawn from her own life studies and revealed a fascination with the profusions of time, place, and connection.

Intensely colored, intensely subjective, dedicated on the opening page to both "lovers of art" and "lovers of insects," Merian's animals are oversize, the plants are shrunk, the proportions distorted; the animals in Merian's *Metamorphosis insectorum Surinamensium,* the masterpiece she published in Amsterdam in 1705, "appear palpably close, yet imaginary and distant at the same time," as if we, too, are running a lens over their surfaces.[15] Yet as never before, the drama of metamorphosis is given unity. On the same page, she paints the larva, the chrysalis, the butterfly, and the plant on which the caterpillar feeds. (Sometimes she includes the eggs, proof that she had assimilated Francesco Redi's 1668 demonstration that maggots developed from eggs and not via Aristotelian spontaneous generation.) It is a dynamic, interactive world. Its principles are transformation, holism, and the overthrow of that earlier taxonomy of Aristotle, Aldrovandi, and Moffett, which segregated the insects into those that crawl and those that fly and, without knowing what it had done, sundered the butterflies and moths from their larvae.

7.

Michelet greatly admired Merian's paintings. He embraced his fellow traveler in the land of the insects and felt a secure bond across the centuries. Her paintings, he thought, not only expressed the feminine qualities that he expected to find—"the softness, breadth, and fulness of the plants, their lustrous and velvety freshness"—but remarkably also had "a noble vigour, a masculine gravity, a courageous simplicity."[16]

He examined the hand-colored copperplates that fill the *Metamorphosis.* All is change, all is impermanence, all is connection. The vitality of life itself erupts against the artificial tidiness of scientific categories.

Nonetheless, the questions that gnawed at him are not solved here. What is the germ that carries through from one form to another, from

one being to another? What is it that persists? What kind of creature is this? Is it one or is it many?

In Japan many centuries earlier, the Lady Who Loved Worms spent her days collecting caterpillars from her garden, ordering them, examining them, admiring them, exclaiming over them. She was contemptuous of butterflies, worthless things compared with the larvae from which they came and which could furnish her with, for example, silk. She liked the little crawly things. She was drawn to things that lacked pretense. She admired the fundamental phenomena—that is, the ever-changing reality behind the "reality" in which we foolishly live. It was, she said, "the essence of things" that interested her; it was the *honji,* a Buddhist term that the unknown author of the famous twelfth-century story uses to mean something like "original form," "original state," "primary manifestation."[17] "The way people lose themselves in admiration of blossoms and butterflies is positively silly and incomprehensible," said the young lady. "It is the person who is sincere and inquires into the essence of things who has an interesting mind."[18]

But Merian, riding her colonial donkey through the forests of Suriname, sailing to Amsterdam in a flurry of self-publishing entrepreneurship, found herself somewhere else entirely, completely disconnected from such thoughts. Her energies were observational, her analytics were visual. She must have abandoned ontological rumination when she quit West Friesland and tired in the most profound way of self-denial. Her principle is beauty, its creation, its appreciation, the surrender to its ineffability. "One day," she writes in one of her unaffected commentaries on the Suriname engravings, "I went far out into the wilderness and found, among other things, a tree the natives call a medlar. . . . There I found this yellow caterpillar. . . . I took this caterpillar home with me, and it soon turned into a light-wood-colored pupa. Fourteen days later, near the end of January 1700, a beautiful butterfly emerged. It has the look of polished silver, covered with the most appealing ultramarine, green, and purple; it is indescribably beautiful. Its beauty cannot be rendered with a brush."[19]

And Michelet, straining too—though in a different way—to grasp both the poetics and the mechanics of transformation, found himself meshed in a metaphysical limbo. History plays strange games with his-

torians. Have you ever visited the Puces de Paris Saint-Ouen, the famous flea market in central Paris? To get there, exit the metro at Porte de Clignancourt and look for the junction of avenue Michelet and rue Jean-Henri Fabre.

Wherever life takes you, there is always something that refuses to follow. However you travel, there is always something that tags along uninvited. "Everyone who walks this earth feels a tickling at his heel," Kafka's famous ape, Red Peter, tells the assembled academy. Kidnapped from his jungle, carried in chains across the ocean, forced to choose between the zoo and the vaudeville, transformed into something new, something part man, part greater than a man, no longer able to reach back to the old ape truth.[20] "Whatever you do," wrote Max Brod, Kafka's friend and literary executor, "it is always wrong." How symptomatic is it that, amid all the literature dedicated to butterflies and moths, until recently there was no authoritative field guide to the caterpillars of any region? Conceptually and taxonomically, their existence is somehow doubtful. Despite all their defenses, less than 1 percent survive to adulthood.