

Two Insects

consistency.

Reaching a depth of two feet or so into the bank, Sphecius hollowed out three branching chambers, each the size of a small hen's egg, then, her nest completed, made her way back to the surface and took wing. Circling the nest site a couple of times, she imprinted its location onto her memory, then flew off toward the apple tree to secure food for her future offspring's larder.

Beginning at dawn the day of Tibicen's emergence, the shrill, monotonous wail of the cicadas issued from the apple tree and, for that matter, from nearly every other deciduous tree in the surrounding countryside. Actually, although the volume was tremendous, only half of the cicadas abroad were involved in the chorus. A Greek poet once wrote, "Happy the cicadas' lives, for they all have voiceless wives." Indeed, the sound-producing organs—among the most complex in the entire animal kingdom—are found only on the males.

There are two such organs, one on either side of the abdomen, and the mainstay of each is an elliptical membrane, called the tymbal, rapidly flexed by muscles beneath it. With each contraction, the tymbals produce a tiny "click" that is amplified, resonated and projected by a complicated system of accessory membranes and adjacent air sacs. So rapidly do the tymbals vibrate, however, that individual clicks are indistinguishable, running together into an unbroken, chainsaw-like whine.

As Tibicen imbibed her breakfast of sap, a male near the end of her branch sang tirelessly, shaking so with the effort that he was little more than a metallic green blur in the morning sunlight. Her hunger satisfied, Tibicen retracted her beak and slowly approached the nearby minstrel. Whether or not she was actually attracted by his deafening serenade no one can say for sure, but in one way or another they identified each other as male and female and proceeded to mate.

Afterwards, Tibicen went off to prepare for that time when she would lay her eggs, and the male settled down to sing—and hopefully to mate—once again. But suddenly there was an ominous buzzing, a shadow, and a rocketing, black-and-yellow blur, and the song of the male was cut short, ending in a piercing, anguished shriek and followed by silence.

The cicada's song was uncannily ventriloquistic, but this was of no help in deceiving Sphecius, who probably homed in on him by sight. [Later in the summer, she would be seen capturing mute females as well as their noisy mates.]

Like a missile, Sphecius knocked the cicada to the ground. There was a brief, buzzing struggle, but soon her quarter-inch sting found a critical nerve center and her prey lay motionless—not dead, but paralyzed and preserved, in a sleep from which he would never awake.

The hunt successful, Sphecius still faced the chore of transporting a burden several times her own weight back to her nest and its waiting chambers. Taking off with such a payload was impossible, and dragging it through weeds and over rocks nearly as hopeless, so Sphecius started to climb, hauling her prize after her up the trunk of the apple tree. Reaching a convenient perch, she scanned the terrain below, picked out the direction of her nest, then launched herself, wings beating furiously, into a controlled, slanting fall. Clumping heavily to the ground, still several yards from her burrow, she struggled to the top of a burdock plant and made another brief flight. Only when she was just inches from her goal did she straddle her prey and drag him, on his back, to the nest opening.

After a quick inspection of the premises, assuring herself that all was in order, Sphecius pulled the cicada down the main shaft and into one of the vacant chambers. She then laid a single egg, attaching it to the underside of the paralyzed insect just behind one front leg.

In the weeks to come, Sphecius would stock the empty chambers of this nest, fill them in, and complete as many more nests as the duration of her prey's adult existence allowed. In every case, her excavated nurseries were provisioned with cicadas—sometimes with one, other times with two. Those cells with two perhaps give rise to the larger, female wasps.

Her own life would come to its end abruptly on some cold night in autumn when, as she clung perhaps to some dry and withered weed, her delicate tissues simply froze solid.

High noon two days after her mating found Tibicen hard at work among the branches of the apple tree. Selecting a twig right for her purpose,

she worked her way along its length, pausing every quarter-inch or so. At every stop her powerful ovipositor swung into action, its twin saw-blades sliding back and forth, slicing through the tough wood. Into each slit Tibicen pumped several eggs before moving forward to make her next incision. Eventually, after entrusting upwards of 400 eggs to the tissues of the old tree, a much weakened Tibicen withdrew her ovipositor for the last time and stood motionless, as if at a loss for what to do next. Ending the cicada's indecision, a passing English sparrow landed and snapped her up, consuming her tender abdomen while casting her unpalatable head and limbs to the wind.

This was no tragedy, for with the conclusion of egg-laying Tibicen's life was effectively over, and shortly—even with no outside help—she'd have died of plain old age, joining multitudes of her fellows to feed other insects, birds, fish, small mammals and, eventually, microscopic decomposers.

Back up in the old tree, the fragile twig was weakened by Tibicen's work, and soon died beyond the point of egg-laying. One afternoon a sparrowhawk, having just killed a vole, flew with his prey to the tree and perched on one of its upper limbs. His landing barely jostled the branch, but it was enough to loosen the egg-laden twig and send it plopping into the weeds below.

The first egg laid by Sphecius hatched in two days in the darkness of its subterranean nursery, and the larva wriggled out onto the great bulk of the numbed but still living cicada. There was nobody around to teach the young wasp, but somehow he knew that the inert object sharing his chamber was food, and he lost no time in getting to work with his powerful jaws.

In just a week the larva emptied his pre-stocked pantry—killing the senseless cicada at last—and grew to full size. This accomplished, he constructed a cocoon of silk and particles of earth, and settled down inside it for a period of dormancy that would last for nearly eleven months.

In the early weeks of July he would change into a pupa, and shortly thereafter—following the trail blazed by Sphecius and the 100 million generations that had gone before—he would emerge, glistening, into the sunshine of a mid-summer morning.

It was nearly a month after that first twig fell to the ground that the eggs within finally hatched and the nymphs—white and antlike newborns—crawled out onto the soil. It would be much longer before they glimpsed this terrestrial landscape again.

The first young cicada to emerge from the twig took no time to admire the view from the surface, but rather began to burrow immediately. Loosening the compacted soil with fluids exuded from his own body, the nymph struggled downward till he reached a slender rootlet. Hollowing out a small chamber, he pricked the root with his tiny siphon and took his first drink of sap.

He would remain underground for two years. His company: mites, springtails, earthworms, and last season's cicada nymphs—now one year old, destined to emerge the

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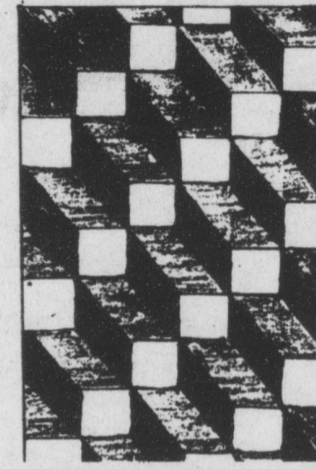
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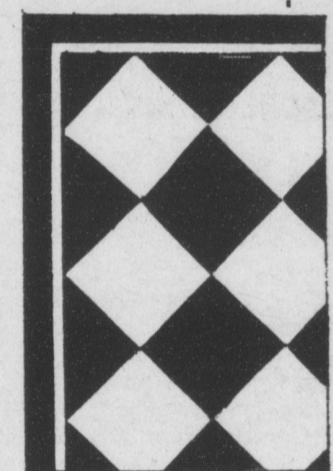
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Six-legged Methuselah

Tibicen and her kind are surely familiar, at least through their songs, to anyone who has spent a summer in this area, but there is another cicada—with an even more intriguing life story—found in the eastern United States and, in fact, nowhere else in the world.

I refer, of course, to the famed seventeen-year "locust" (*magicicada septendecim*). Individuals of this species are a bit smaller than those of the annual variety, and sport eyes and wings of fiery orange. They differ also in that they're never found (as adults) in the summer, but rather emerge in late spring following a subterranean nymphal existence of fully seventeen

years, the longest of any insect.

One particularly large brood made its appearance in Pennsylvania, and in some seven other eastern states, in 1974. Even as you read this, the nymphs resulting from this emergence tunnel beneath our feet. But before they see daylight the United States will elect three more presidents, the world will meet in three more Olympic Games, the toddlers of today will enter high school and the 1980's will give way to the 1990's.

Their story is surely among the strangest in nature, and it unfolds in our own backyards, so if you miss Haley's Comet in 1986 be sure to hail the triumphant return of the seventeen-year cicadas in 1991.

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