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Beacon Bugs

Every 29 years, their light proves disastrous.



BY SHARONA MUIR
PHOTO BY FRANCESCO MARIOTTI
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I come from a long line of naturalists and scientists. Every few generations, someone is born in our family who sees invisible animals; in the mid-20th century, that was myself. As a small child, I complained to my granduncle Erasmus—my predecessor, the elder spotter of invisible beasts—that since no one liked to go with me to catch invisible beetles, I wanted to see only what the other kids saw. From a height beclouded with cigar smoke, Granduncle rumbled, not unsympathetically, “And what if Leeuwenhoek had wanted to see only what other people saw?”

I said that Leeuwenhoek had had his microscope, but I couldn’t make the other kids see what I saw. They didn’t look hard enough. They didn’t try, they didn’t care, they laughed at me. I must have sounded quite upset, because—like a monstrous barrier reef looming—the grand-avuncular moustache approached my face and stopped, smelling of ashes and leather. I observed Granduncle’s nostril hairs in the defile above his moustache, flying on his breath like pinfeathers.

“It’s not how hard you look, Sophie. It’s the way you see.” A tuskly yellow smile accompanied these words, which have since inspired my writing about the invisible beasts that I study: creatures seen only by other invisible creatures (and by me, happily for science.) I write to share, as Granduncle put it, the way I see. In a word, I see the parallels between invisible animal life, and human life. I might even say that we humans are the most invisible beasts, because we do not see ourselves as beasts, even though every aspect of our lives is an aspect of our being animals. To grasp our nature, we need to see the beasts that we don’t see—ourselves and others. The strangest case I’ve studied, of the latter, is that of a firefly species whose generations alternate periodically between being visible and invisible—with disastrous results for humans.



ail holy Light,” sang the poet John Milton. Who doesn’t welcome light into a darksome world? Beacon Bugs, that’s who. This native firefly species exhibits a unique feature. Every year, for 28 years, they are born invisible to the human eye, and duly mate and die unbeknownst to us. But on the 29th year, they produce one visible generation that outshines every other firefly species; it’s stunningly brighter than the others and it’s visible to the civilian, as Granduncle Erasmus called the ordinary folk who couldn’t see the creatures that he and I could. For a few weeks, this special generation of Beacon Bugs is a glory, a far-flung, bedazzling beacon, a revelation of radiance, reminding all creation that an invisible firefly is a contradiction in terms and that if you make light, you should be seen. Humanity becomes aware of them at this point, and suffers the consequences.

To understand Beacon Bugs and their effect on our lives, you need to know some of the basic traits and circumstances that most fireflies share. Fireflies attract mates by emitting light in patterns consisting of flashes and steady glows: The patterns are codes telling a male and a female firefly that they’re of the same species. But fireflies’ codes, besides attracting mates, also make them vulnerable to a predator: the cannibal firefly genus *Photuris*. How *Photuris* exploits the codes of other fireflies will shortly be explained. For now, suffice to say that of some 2,000 firefly species living in habitats from Malaysia to the Great Smoky Mountains, only a single species uses invisibility as a means to foil *Photuris*. That species is Beacon Bugs. Unfortunately, their unique defense of invisibility turns out, periodically, to be worse than being eaten alive by *Photuris*.

All fireflies are creatures of incandescent romance. They cannot be bred in laboratories any more than love can. During courtship, the male offers his mate a gift of something nutritious (this isn’t an entomology textbook, so call it chocolate). The happy couple deposits their eggs on the ground (not troubling with nest construction, free spirits that they are) and the larvae burrow, becoming glow-worms, carrying the torch of firefly heritage almost from the moment when they were gleams in their parents’ abdomens. And nothing, to a human eye, seems as dreamily romantic as the fireflies’ mating flight.

Female Photuris fireflies mimic the mating-flashes of other species’ females, to trap and eat unwary males.

The mating flight is a North American custom. Old World firefly courtships are often sedate: Males fill up a tree and put on a light show, all together, to attract females (one recalls, for some reason, the Red Army Chorus). On our shores, however, each male firefly goes for a solo evening cruise, flashing his taillights over lawns, at dusk. You see glimmer-ribbons of fireflies hovering in a lovely layer a few feet above the grass; you follow the floating sparks, living love letters scribbled on the dusk, begging, importuning a mate whose body, delicious, burning ripe, is hidden in the dimness. It’s dark, you’re still looking at the fireflies, you’re thinking about how nice romance is and how the fireflies are all getting some, and being—forgive me—oblivious to the nightmare taking place under your nose.

A male firefly wafts over the tips of towering grasses, working his lights, flashing the code signal engrained in him for the sake of the rapturous moment when a female, receptive, eager, illumines herself in response. After a scintillating exchange, he tumbles from the air. He meets his bride. She flips him on his back, pinning him down with six pretty feet—she’s bigger than he is—and proceeds to rip into his soft belly, tugging at his flesh, chewing with the steely mandibles of the predator genus, *Photuris*. Her antennae vibrate with voracity; rude smackings echo through the grass-roots. Poor lovelorn bug! He hasn’t mated, he hasn’t

reproduced; he dies. She was the wrong kind. To her, he was just a piece of meat.

A firefly's flash can discourage predators who don't like a meal that blinds them.

This scary proceeding is called “aggressive mimicry.” Female *Photuris* fireflies mimic the mating-flashes of other species’ females, to trap and eat unwary males. *Photuris* is a real horror, a remorseless insecticide, a gothic subfamily curse, and the most fatal of femme fatales. To woo a female of his species, the *Photuris* male must trick her by imitating the flashes of another species’ male—then, as the *Photuris* lady is getting out her (figurative) sushi knives, he drops his disguise and starts flashing dirty firefly talk. From a safe distance. If he’s even sneakier, he imitates the *female* of another species. This draws the poor suckers of unwary males as well as the greedy *Photuris* girl, whetting her (figurative) kebab skewers. What happens? The *Photuris* male in drag ambushes the other males, opportunistically eats them, and then, taking every precaution... How tasteless.

Why don’t the victimized fireflies change their mating signals? Oh, they do. North American fireflies continuously update their luminous codes, but what can I say—*Photuris* is an aggressive mimic, by definition, by inclination, and by vocation. She probably gets a kick out of cracking codes before dinner. Reader, look at your evening lawn, how it sparkles, flashes, and glimmers! A lagoon of love crisscrossed by pirates flying false colors, sowing deception, death, and the shipwreck of happiness, and all through the pure medium of light. It’s July, but honestly, aren’t your bare feet getting cold?

Beacon Bugs are the firefly species that has taken the most drastic step in self-defense, with their periodic invisibility. For 28 years, Beacon Bugs cannot be seen by *Photuris* or other visible predators, and what’s more, they don’t glow. Since I have the privilege of observing invisible Beacon Bugs, I can attest that without their lights, the bug is supremely inconspicuous. It resembles a slimy nub of tobacco, over which folds a pair of leathery *elytra*, or front wings, as if the nub had toughened in a forlorn spittoon. Lights extinguished, the first invisible generations show a healthy population bulge, saved from the depredations of *Photuris* and her jerky boyfriends, as well as a host of other predators. My statistics heave a sigh of relief. But then they puzzle: Instead of leveling off, the Beacon Bug population gradually declines. The last invisible generation is so thin on the ground it’s practically decimated. Why should a powerful defensive strategy accompany the decline of the species it protects?

Some hypotheses come to mind. A firefly’s flash can discourage predators who don’t like a meal that blinds them. With the tactic of lightlessness, Beacon Bugs risk drawing predators that they haven’t faced before. Invisible animals can see one another, and in spring, for example, the world is as full of invisible frogs and toads as it is lacking in charming princes. There’s no free lunch, especially if you are lunch. Another hypothesis might better explain the slow decline. Like many fireflies, Beacon Bugs spend their time in larval form underground. A lot can change in that time: A meadow can be paved, dug up, flooded. When the adult Beacon Bugs emerge from underground, they may have trouble finding one another—have you ever driven around an unfamiliar neighborhood in the dark, without headlights, looking for someone? Perhaps the newly adult Beacon Bugs have trouble meeting up, and become gradually separated into smaller, more vulnerable groups.

I have good reason, however, to believe that the Folly's skipper was not drunk, but did see a lighthouse beam where none should have been.

Since, however, fireflies are flying enigmas whose glow tantalizes the laboratories that can't tame them, let's forget reasonable hypotheses. Just for the argument, let's try love. If you were a Beacon Bug, how would you feel about mating with somebody who groped his way toward you, looking—not to put too fine a point on it—like tobacco spit, or at best, a cockroach? Maybe the Beacon Bugs fail to multiply because they feel increasingly, pardon the expression, *turned off*?

With the female bugs' loss of interest in mind, let us ponder the scandalous wreck of the luxury sloop, *Folly*, on a cloudy summer night in 2011, in Lake Erie. The *Folly* went onto Niagara Reef and foundered, due to hull failure. Her owner, the magnate Hoagland “Hog” Makemerry, and his young wife, Tipple, both perished. Afterward, the Makemerry family dragged the *Folly*'s skipper through a televised trial, during which he testified that on the night of the disaster, he'd been steering toward the Toledo harbor light—an absurd claim, since Niagara Reef, the yacht's last position, was much too far from the Toledo harbor light for anyone to have seen it. The bellies of viewing audiences shook with laughter from Cleveland to Detroit. The prosecutor, vengefully cordial, asked the skipper if he reckoned the distance between Niagara Reef and the Toledo light? Oh, he did know the distance? Twenty-two miles. Not twenty-two feet? Well, then, he couldn't have seen the Toledo light, could he? Harrowed but curt, the defendant stuck to his story about a lighthouse beam, even after the comment from the bench, which was,

“Glug, glug.”

“How shall I spell that, Your Honor?” asked the court recorder, deadpan amidst hilarity.

“You can spell that, G, R, O, G.”

I have good reason, however, to believe that the *Folly*'s skipper was not drunk, but did see a lighthouse beam where none should have been. Consider this curious fact about shipwrecks in Lake Erie: a ship goes down almost exactly every 29 years—the sandsucker *Isabella Boyce*, off East Point Reef, 1917; the teak barquentine *Success*, off Port Clinton, 1946, and so on. I would not be surprised if this pattern were found nationwide, from Manicous to Point Reyes, along any North American coast where sailors tell of phantom lights that lure ships to their destruction, any coast with meadows and marshes where fireflies are hatched... Here is what surely happened to the *Folly*.

It was a cloudy, moonless night when the *Folly* followed the sweep, sweep, sweep of the beam penetrating the rough darkness, the guiding beam that her skipper reflexively trusted. Who thinks twice about following that light unlike any other, a light that speaks our language, cheering us on? He could not have guessed what was happening up there in the utter darkness along the *Folly*'s heading, where swarms of male Beacon Bugs were coalescing in their thousands, flashing on and off, on and off. Even if the skipper had been a boy who collected fireflies in a jar, released them in a dark closet, and made them flash in synchrony with his flashlight, how could he imagine a sky-high swarm of fireflies imitating, to the second, the long reaching ray and rhythm of the Toledo light? Through the tragic night, the massed cloud of male Beacon Bugs, pressed to the limit, mad for love, threw off concealment and pulsed the brightest signal they could muster. To any passing ship, it looked like the light of harbor, of loving arms and home.

So the wreck of the *Folly* was the collateral damage of a revolution occurring every 29th year among the Beacon Bugs. It may be

ironic to call a periodic event a revolution, yet as long as revolutions continue to occur in the general revolving of time, there is no irony in testifying to their awesome spectacle, their burning requirement, and their mysteriousness. For how could any of us, let alone the captain of the *Folly*, fathom the promptings that compel a generation to break with the wisdom of its shadowy parents and grandparents and great-grandparents, and to throw itself ablaze in the midst of darkness, imitating the greatest lamp in its universe? The times had turned, as they had turned before; a revolution had begun, that had begun before. You might say that desire reinvents the wheel and the wheel is always, yet never quite, the same, and the little differences add up to hope. Along the shores, female Beacon Bugs gathered in their myriads, what was left of them, and love-signals flashed from earth to sky, from sky to earth. And *Photuris*, eternal predator, repetitious nemesis of all new hopes, surprised and pleased, added a long-missed item to her menu...

Washed up on the killer rocks of Niagara Reef, agape like a dead clam, lies a gold compact last held in the fingers of poor Tipple Makemerry; it used to reflect a human face, an animal face; now it reflects the cold cabal of the Pleiades. Desire for light, betrayal by light—how unholy it seems, yet how fitting and natural it is.

Sharona Muir is a recipient of the National Endowment for the Arts Fellowship and has published work in Granta, Orion, and other magazines. She is the author of The Book of Telling.

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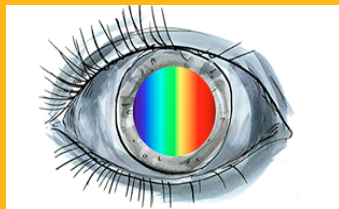
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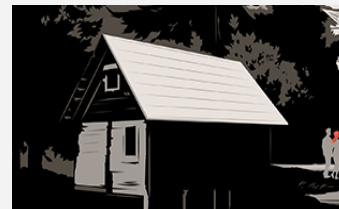
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