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Outgrowing the Traditional Grass Lawn

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BY FERRIS JABR

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As I see it, my garden has three main features: a small stone patio; a few strips of hydrangea, lilies and shrubs; and, in the middle of these floral borders, a rectangle of untamed clover, creeping charlie and various weeds. My first instinct was to uproot all the weeds in the neglected lawn, prepare the soil and seed it with turfgrass. "Are you sure?" one of my landlords asked me as we stood in the backyard shortly before moving day. "I mean, you would have to

water it and we don't have any sprinklers. You'd have to get a lawnmower, too, and store it somewhere."

I nodded in reluctant consent. Even though I'd always loved gardening—growing vegetables in particular—the prospect of watering and trimming a sizeable carpet of grass week after week did not excite me. Mowing had been an occasional chore in my childhood, not a regular responsibility. Besides, what was so bad, really, about a weedy lawn? You could still walk and sit on it. And it was kind of more interesting—certainly more varied—than a conventional grass lawn.

I looked closer. There was more than just plant life here. A cabbage white butterfly bobbed among the weeds in its paradoxically fumbling yet dainty way. A honeybee circled and hugged a clover blossom. In the past few months, for a series of related writing and editing assignments, I'd been researching honeybees—which arrived in America with the colonists—as well as the many bee species native to our country: metallic blue sweat bees that lap up human perspiration; solitary bees that nest in wood or soil; mason bees that fashion leaves into nurseries.

Across the country, native pollinators have been dying for many years, primarily because we have replaced so much of their once diverse natural habitat with vast swaths of monoculture: acres and acres of a single crop, many of which—corn and wheat, for instance—are poor sources of the pollen and nectar insects eat. Likewise, I had recently learned, weed-free flowerless grass lawns are monoculture in microcosm; they, too, are wastelands for pollinators, offering no nourishment of any kind. We associate a lush green lawn with vitality, but in many ways a grass lawn is the most sterile part of a garden.

Ironically, the dwindling number of native bees is as much an agricultural loss as an ecological one. Although some major crops like corn and wheat are largely wind-pollinated, one third of our food supply—including apples, almonds, cherries, blueberries, lettuces, avocados and broccoli—depends on pollinating bees. Domesticated honeybees simply cannot visit all those plants on their own and in many cases native bees are more efficient pollinators of plants with which they co-evolved. Bumblebees, for example, vigorously rattle blueberry flowers, coating themselves in so much pollen that they deliver around 15 to 20 pollen grains each time they visit a new blueberry flower compared to a honeybee's typical cargo of three to four grains. Never has the well-being of wild bees been so crucial as now, when honeybees are dying en masse for a multitude of reasons—pesticides, poor nourishment, tenacious pathogens—and native bees find fewer places to live and so much less to eat.

So how could I steal even one more yard's worth of what little viable habitat our wild pollinators have left? Surveying my garden, my impulse to rip up a flowering cluster of so-called weeds and replace it with a monochromatic mat now struck me as somewhat selfish and completely uninspired. Given a plot of land beside one's house to use as one wishes, why turn so much of it into a lawn? Why must a lawn consist solely of uber-green, short-cropped, nearly identical blades of grass? What is a lawn anyways?

The history of the lawn begins at least 900 years ago in Great Britain and Northern France, both of which have maritime climates with relatively mild winters and warm humid summers that are ideal for many different grasses. In its inception, the word 'lawn' may have referred to communal grazing pastures —clearings in the woods where sheep and other livestock continually munched wild grass into submission. Even today, some place names retain the memory of these early lawns: Balmer Lawn in England, for example,

encompasses 500 acres of grass pasture. Soon enough, people found other uses for grasses: aesthetics, sport and leisure. King Henry II (1113 to 1189) had gardens at Clarendon Palace that boasted 'a wealth of lawns' and Henry III (1216 – 1272) ordered laborers to slice up tracts of naturally occurring turf and transplant them to his palace. The world's oldest bowling green, in Southampton, England, has been maintained since at least 1299.

In ancient times, lawns were not always expanses of unbroken green, however. Some medieval paintings of gardens depict carpets of turfgrass stippled with various flowers, such as lily of the valley, poppies, cowslips, primroses, wild strawberries, violets, daisies, and daffodils. People walked, danced and relaxed on these flowery meads, which were meant to imitate natural meadows. In the 15th and 16th centuries, Europeans used white clover, chamomile, thyme, yarrow, self-heal (*Prunella vulgaris*) and other low-growing meadow and groundcover plants—sometimes mixed with grasses—to create lawns and pathways on which to walk and mingle. In the early 1900s, a weed known as cotula (*Leptinella dioica*) began invading bowling lawns in New Zealand. When the groundsman of the Caledonian Bowling Club tried to get rid of the weed by scarifying the lawn, he only quickened its spread. Rugby players noticed, however, that they ran faster and played better on the tightly knit, smooth carpet formed by the weed than on grass. By 1930, Caledonian Bowling Club replaced all its grass with cotula; other clubs did the same.

For most of history, however, mixed plant lawns and non-grass lawns have been the exception, in part because a smooth, well-kept, lush grass lawn became as much a symbol as a functional part of one's property. In the early 19th century, vast grass lawns surrounding manors were not only aesthetically pleasing—providing unobstructed views of an estate—they were also further proof of wealth. To keep their lawns neat and trim, British aristocrats and

landed gentry had to look after grazing animals—most commonly a flock of sheep—or hire laborers to slice through overgrown grass with scythes.

Eventually, the idea of a grass lawn migrated to America, where it has evolved in its own way. At first, early colonists planted gardens of edible and medicinal plants, not having the time or money to maintain a lawn. Grasses native to America were generally too unruly to make neat lawns anyhow. Some wealthier citizens wanted to imitate the lawns that surrounded abbeys and mansions in Britain, however, and suitable turfgrasses were imported from Europe and Asia. English engineer Edwin Beard Budding changed lawncare forever when he invented the lawn mower in 1830—although it was a bulky wrought iron contraption that often dug up the soil. Others improved this first mower, making it lighter and sleeker. People on either side of the Atlantic could now mow modest-sized lawns themselves instead of requiring dozens or hundreds of workers or a flock of sheep.

Michael Pollan has pinpointed the 1860s as a pivotal moment in the history of American lawn: in that decade, landscape architect Frederick Law Olmsted designed the suburban community of Riverside, Illinois. Olmsted forbade fences and walls and ran a seamless ribbon of green lawns in front of each row of houses. Around the same time, influential landscape designers such as Andrew Jackson Downing and Frank J. Scott published popular books advocating the lawn as a necessity for any respectable homeowner. “A smooth, closely shaven surface of grass is by far the most essential element of beauty on the grounds of a suburban house,” Scott wrote. “Let your lawn be your home's velvet robe, and your flowers its not too promiscuous decoration.”

The lawn sprinkler appeared in 1871 and garden hoses became cheaper and more durable. Between 1947 and 1951 Levitt & Sons, Inc. built the first mass-

produced suburban community: every one of the 17,000 houses had a lawn. Levittown became a model for suburbs everywhere and each new generation of homebuyers inherited houses with grass lawns. Despite America's devotion to private property, any one homeowner's lawn became every neighbor's business. A well-manicured lawn—or, conversely, an untended jungle—was a reflection not just of its owners, but also of the entire surrounding community. Even today, surveys show that—in contrast to citizens of the U.K.—Americans care a great deal about the state of their neighbors' lawns. In a particularly memorable scene from F. Scott Fitzgerald's *The Great Gatsby*, Jay Gatsby—who lives in one of the grandest homes in the posh West Egg—gives his neighbor Nick Carraway's modest house a makeover, including a well needed shave for his "ragged lawn."

Today, the continental U.S. has more than 40 million acres of residential and commercial grass lawns, a number properly calculated for the first time in the early 2000s by Cristina Milesi of NASA and her colleagues using satellite data and aerial photos. In terms of acreage, turfgrass is on par with wheat, the country's fourth largest crop. All those lawns provide some clear benefits to people and the environment: they suck up carbon dioxide—a greenhouse gas that traps heat in the atmosphere—potentially mitigating global warming (as long as establishing, mowing and fertilizing a lawn does not produce too much carbon dioxide and nitric oxide to negate the benefit); they prevent soil erosion and dissipate heat, counteracting the urban heat island effect (in which cities and towns full of metal and concrete retain much more heat than surrounding rural areas); grass lawns are ideal for pick-up games of soccer, rugby and touch football; they give young children a safe and soft outdoor space in which to play; and—as more and more ecopsychology studies demonstrate—green spaces reduce stress, restore attention, elevate mood and make people feel better about life in general.

Ultimately, however, the consequences of our obsession with pristine grass lawns may undercut any benefits. In addition to depriving both native pollinators and honeybees of wild habitat and food—and thereby threatening our agricultural system—lawncare guzzles water, spews smog and soaks the earth in potentially harmful chemicals. Milesi's computer simulations revealed that all the nation's lawns demand about 200 gallons of potable water per person per day. Some research suggests that gardens and parks more or less left alone capture much more carbon than highly cultivated grass lawns. The Environmental Protection Agency estimates that gas-powered lawnmowers—which emit 11 times more air pollution than a new car for every hour of operation—contribute as much as five percent of the smog in some areas of the U.S. Every summer, Americans spill 17,000,000 gallons of gasoline when refueling mowers and other garden equipment. And of the approximately 90 million American households with a yard or garden, 45 million use chemical fertilizers, 46 million use insecticides and 47 million use chemical weed-killers. Such chemicals—many of which, especially older varieties, have known health risks—contaminate natural habitat and seep into our homes and drinking water.

A conventional lawn is also a complete perversion of grass's typical life cycle. Lawn grasses fall into two general categories: cool-season species, such as fescue and bluegrass, and warm-season species, such as Bermuda and zoysia. During the summer, wild cool-season grasses stop photosynthesizing, turn brown and grow far more slowly if at all in order to conserve energy; in the fall, they rebound. Conversely, wild warm-season grasses become dormant in cooler months and flourish in the summer. To keep our grass lawns green year-round, we continuously douse them with water and fertilizer, forcing the plants to grow nonstop. But we don't want them to grow too tall, of course. By

mowing down grass before it has the chance to produce flowers and seeds, we effectively trap the plants in perpetual sexual immaturity—although many are still able to reproduce asexually, cloning themselves and spreading laterally with creeping roots. Mowing also requires grass to devote a lot of energy and resources to healing itself by sealing off all wounds. The smell of freshly cut grass—so often comforting and nostalgic—is a chemical alarm call: a bouquet of fragrant volatile organic compounds that plants release when under attack. Ah, the cycle of lawn. Saturate, decapitate, repeat.

At this point grass lawns are so firmly rooted in American culture that most people never question them. Suburbanites grow up playing on their lawns. All their friends have lawns. It would be weird *not* to have a lawn. Yet most of us did not decide to cover so much of our front and back yards with grass—it was already there. And many people who build a home from scratch incorporate turfgrass by default. The grass lawn is not so much a choice as an imposition—a legacy borne of vanity and avarice that evolved into conformity in the name of community.

Since at least the 1960s—when Rachel Carson stressed the dangers of pesticides used on lawns in her book *Silent Spring*—brazen individuals and small groups of counterculture horticulturists in America and Europe have resisted or outright rejected the conventional grass lawn. In *The New Yorker*, Elizabeth Kolbert describes some of their proposed alternatives:

"In “Noah’s Garden” (1993), Sara Stein…advocates 'ungardening'—essentially allowing the grass to revert to thicket. Sally and Andy Wasowski, in their “Requiem for a Lawnmower” (2004), recommend filling the yard with native trees and wildflowers. For those who don’t want to give up the look or the playing space provided by a lawn, the Wasowskis suggest using Buffalo grass,

one of the very few turf species native to North America…William Niering, who for many years was a professor of botany at Connecticut College…planted trees around his property, then left most of the rest of his yard unmowed, to become a meadow…For the past few decades, David Benner, a horticulturist from Bucks County, Pennsylvania, has been touting moss as an alternative to grass…In "Food Not Lawns" (2006), Heather C. Flores argues that the average yard could yield several hundred pounds of fruits and vegetables per year…"Edible Estates" (2008) is the chronicle of a project by Fritz Haeg, an architect and artist, who rips up conventional front yards in order to replace them with visually striking 'edible plantings.' Haeg calls his approach '"full-frontal gardening."'

More recently, in the birthplace of the grass lawn, a determined graduate student has created an entirely new kind of lawn—if we can still call it that. In the 1970s, when Lionel Smith was about 11 years old, a drought shriveled the garden in front of his home in Bedfordshire, England. Though the shrubs and grass browned, resilient weeds and wildflowers bloomed. He thought it was beautiful, but his father asked him to mow all the flowers down. Not wanting to forsake his pocket money, Smith capitulated. More than 20 years later, while earning an MA in horticulture at the University of Reading, Smith decided to try and make a viable lawn without a single blade of grass—a dense mesh of flowering, low-growing, broadleaf plants that would abide some mowing and walking.

What began as a few experimental gardens with just four species—red clover, self-heal, daisies and yarrow—grew into many tightly woven swards with more than 65 native and non-native species each, and none of them grass. To choose these species, Smith perused data collected by researchers at Sheffield university about the types of plants that grow in British lawns, looking for

soft-stemmed, laterally spreading plants in particular. He settled on violets, English daisies, small-leaved clovers, chamomile, thyme, yarrow, self-heal, lawn lobelias and cotula, among many others. Not only did these flowering plants provide complete ground coverage, they required one third less mowing than traditional lawns (three to nine times a year), in part because some of the plants adapted to regular mowing by curbing their upward growth. In the sward's early stages, mowing is essential to prevent taller species from dominating; once established, however, Smith finds that the swards need less and less mowing each year. And he doesn't water them; England's climate takes care of that.

Even plants that have proved notoriously difficult to grow in British weather, such as the blue-pea, have thrived in Smith's swards. He thinks that the diversity and proximity of the plants mimics some kind of synergy present in wild habitat but lacking in conventional lawns. A more varied and dense root system means a larger and more diverse underground community of microbes and fungi with which plants form symbiotic relationships. In exchange for nutrients, bacteria living in the roots of white clover and other plants absorb nitrogen from the air in soil and convert it into ammonia and nitrate, which plants use to build DNA and many other cell parts. When a white clover plant and its bacteria die and decompose, nitrogen returns to the soil. Smith's swards have increased biodiversity in the skies as well: 25 percent more pollinating insects visit the polyfloral lawns compared to typical lawns and far more types of insects come in general.

This past May, Avondale Park in London installed one of Smith's flowering swards. At the time, the ecology manager of the borough of Kensington and Chelsea was having trouble with a field of fragile wildflowers in the park: any child or fox scampering through the meadow easily damaged the plants.

Smith's grass-free lawn seemed like the ideal solution: a living, flowering quilt capable of withstanding some light foot traffic. Although one of Smith's swards cannot survive the kind of daily wear and tear that turfgrasses in parks usually endure, a little walking benefits the sward, helping to compact soil and roots. So far, visitors love it. Smith says a prestigious gardener—whom he cannot yet name—will soon have a sward in her personal garden and other public parks are interested in adopting his style of lawn as well.

Experimenting with alternatives to grass lawns does not require banishing turfgrass altogether, however. As Smith's research underscores, turfgrass has a useful property not easily matched by other plants: its impressive material resilience. Grass tolerates a lot of trampling without dying and will spring back when compressed by cleats and lounging people's backsides. Some scientists are currently focusing on how to make regions of private lawns and public green spaces more attractive to native pollinators, without uprooting a lawn altogether. Emily Dobbs of the University of Kentucky and her colleagues visit golf courses in the state and persuade the managers to transform some out of the way spots into wild habitat by planting a mix of perennial, native, low-maintenance wildflowers that bloom from April to October—coneflowers, columbines, black-eyed susans, clover, hyssop, and goldenrod, for example. The owners of five golf courses, including one belonging to Marriott Hotels and Resorts, have agreed so far—and the results are astounding.

"I can go out to any flower sites and see huge densities of bees, hundreds and hundreds of bees per small area," Dobbs says. "Usually on golf courses you see one or two species of bumblebees, some honeybees and some metallic sweat bees. On my plots we have seen two dozen species of solitary bees, sweat bees, miner bees and six different species of bumblebee. We've also seen quite a few butterflies." In general, native bees are far less aggressive than honeybees and

only sting if antagonized, so they do not pose a threat to golfers. And, as beautiful as the expansive, undulating, immaculate grass lawns on a golf course can be, people don't mind some flowers here and there; in fact, they like them. The Marriott is so pleased that they plan to establish pollinator habitats in half of their golf courses in the Eastern U.S.

People can do something similar in their own backyards, explains retired biologist Beatriz Moisset of Pennsylvania, who has come up with a charming term for weeds and flowering plants woven into grass lawns. "A lawn can supply food for pollinators and even for birds," she writes. "A perfectly manicured lawn that looks like an indoor green carpet need not be the only ideal of lawn beauty. Instead, a lawn with some variety of plants which includes a few broad-leaved 'weeds' has its own kind of natural beauty; let us call them 'grass companions.'" Grass expert Mary Meyer of the University of Minnesota has another name for pollinator habitats: "bee lawns," which she defines as "a combination of traditional cool season lawn grasses and other low growing plants that support bees and native pollinators." Meyer recommends mingling fine fescues with plants from the mint family, bird's foot trefoil (*Lotus corniculatus*), thyme and the bulb plants squill and crocus. She is currently collaborating with her colleague, renowned entomologist Marla Spivak, on a project that echoes Lionel Smith's research: their goal is to identify low-growing flowering plants that will survive in people's lawns, endure some mowing and foot traffic and provide plenty of nectar and pollen for bees.

For anyone interested in learning how to go about creating pollinator habitat in a private garden, two of the most useful online resources are the websites of The Xerces Society, a non-profit organization devoted to the conservation of invertebrates, and the Lady Bird Johnson Wildflower Center, a research unit of the University of Austin Texas dedicated to native plants. Xerces sells a

variety of pollinator conservation seed mixes—bags of wildflower and grass seed suited to different regions of the country. I have ordered a bag of seed mix designed for the Northeast. In the late summer and fall, a good time for seeding, I'm going to start converting a section of my lawn into something closer to a wildflower meadow. Elsewhere in the rectangle of lawn, I will let the weeds grow as they will, perhaps using my landlords' weed-whacker now and then if some plants get unnervingly tall. My good friend and roommate Olivia and I also plan to claim a section of the lawn for vegetables that we will grow in a wooden container.

This past weekend I spent some time working in the garden, pruning aggressive shrubs, planting flowers and watering recently potted mint and basil. Dragonflies alternately chased one another and perched with the utmost precision on the tips of branches. I discovered that a cluster of weeds with pert leaves had unfurled tiny stars of amethyst. And while clearing a brick pathway of debris from past construction projects I noticed a plump black bee lying on its side. It was a carpenter bee, one of several native species I'd recently learned to recognize. It was dead, but I was certain that it had flown here in the first place because this garden—with its hodgepodge of flowering weeds in place of a neat grass lawn—was so very alive.

FERRIS JABR is a contributing writer for *Scientific American*. He has also written for the *New York Times Magazine*, the *New Yorker* and *Outside*.

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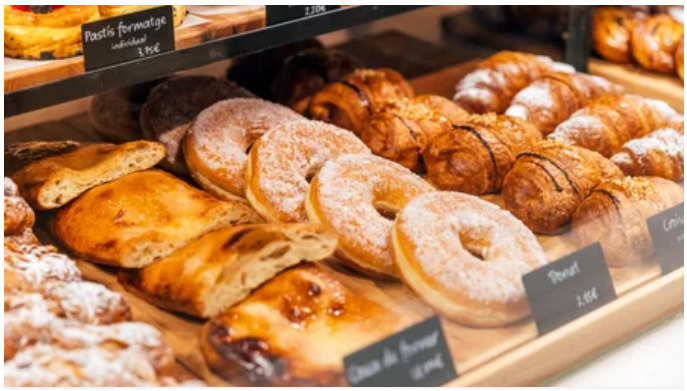

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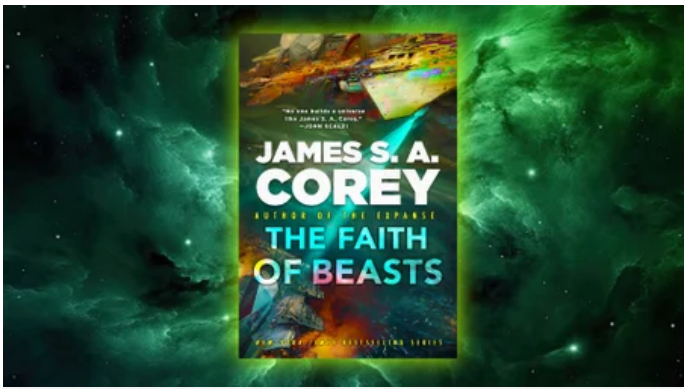

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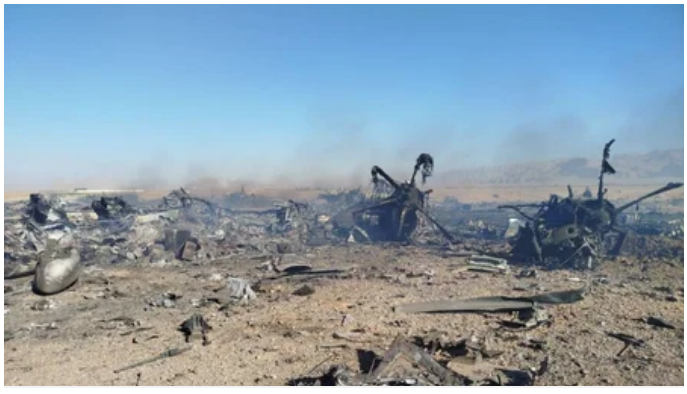

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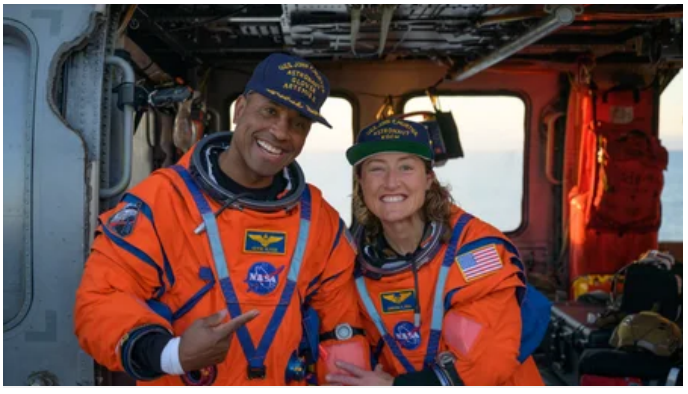

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