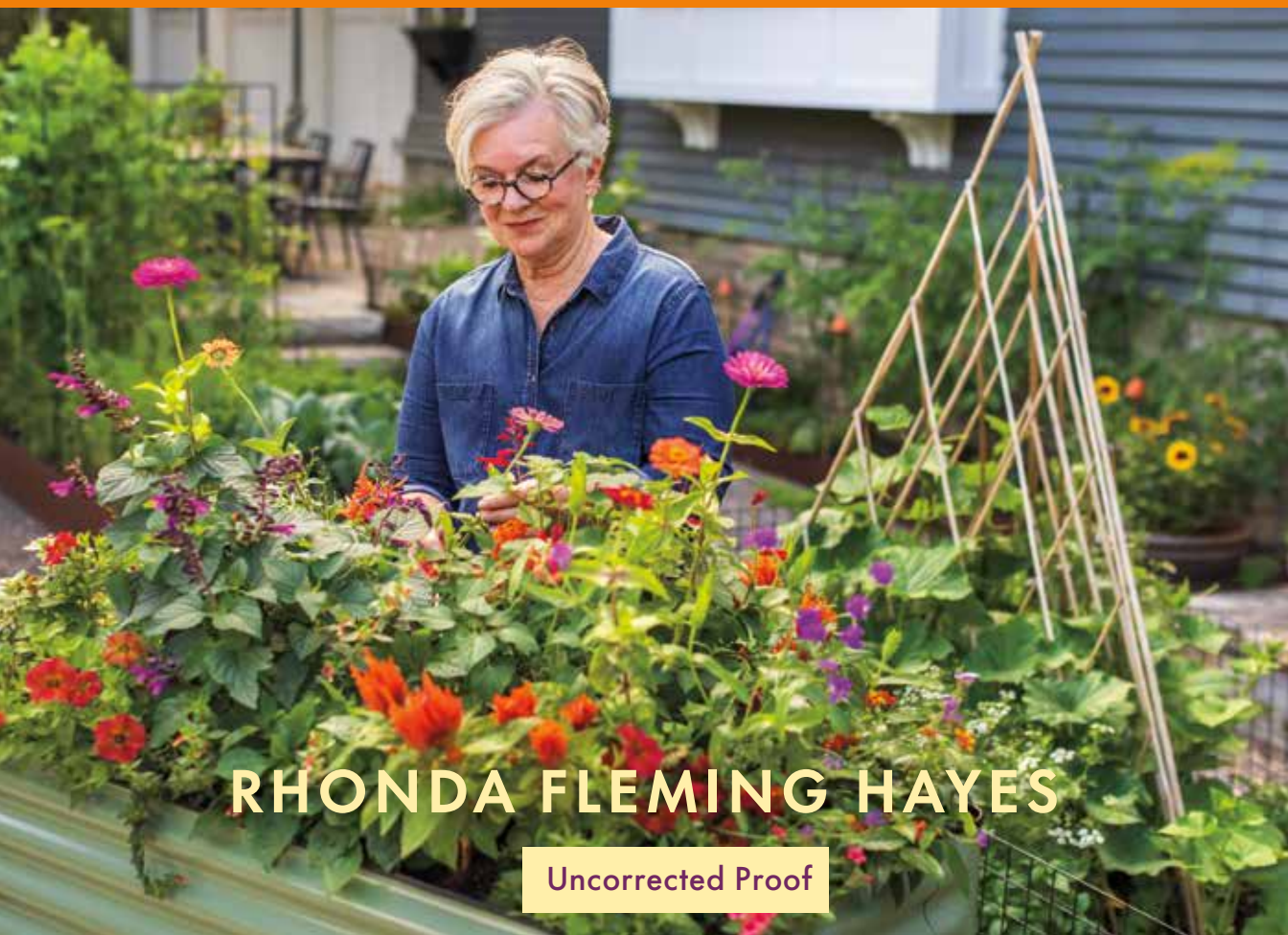
GARDEN FOR LIFE

Strategies for Easier, Greener, More Joyful Gardening as We Age



RHONDA FLEMING HAYES

Uncorrected Proof

PART I

Rightsizing Your Garden

Donna Hamilton bending to check on her perennial garden.

CHAPTER 1

Changes and Positive Aging

It happens gradually—you might notice that a typical garden chore like trimming shrubs or planting bulbs takes longer or tires you out sooner. You're stiff and sore the next day, at least more than usual. When you kneel down to pull weeds you hear a pop-creak sound. There's no way around it: You are getting older. Yet, you might not think of yourself as old. As Oliver Wendell Holmes, Jr. supposedly said, "Old age is always fifteen years older than I am." It's a moving target.

We can't prevent, or slow, the years from passing, but we can influence how our bodies and minds change over time. And if there's one activity that ticks all the right boxes for positive aging, it is gardening. In this chapter, we'll look at the many health and wellness benefits of gardening, along with a bit of the science behind aging and why gardening helps.

Other things we can't prevent are natural events that test our gardens and the ongoing challenges presented by climate change. What we certainly can do is adapt—that's what gardeners do best. And we can do more than that: As stewards of our own little natural environments, we can play an important role in providing for pollinators, supporting beneficial plant species and ecosystems, and taking many more very doable steps to help move society toward a more sustainable future.

Why Gardening Is Good for You

Gardening is so good for us because it challenges and stimulates our bodies and minds. Routine gardening tasks incorporate a variety of natural movement, an ideal form of low-impact exercise. Applying our thoughts and creativity to planning and problem-solving in a garden has numerous mental and emotional benefits, and the hands-on activity of tending plants promotes both physical and mental dexterity. Gardens can be private sanctuaries that provide respite from worldly concerns, and

they can encourage us to strengthen connections with neighbors and others in our communities.

NATURAL MOVEMENT

During our walk together at the beginning of this book, did you catch all my physical movements as I went through the garden? Bending, stretching, kneeling, lifting, and then the digging, pushing, and pulling I planned for the next day? They aren't very different from exercises at the gym—squats, push-ups, lunges, and the "farmer's carry" with kettlebells. But I didn't think to count reps or sets.

Exercise is one of the first defenses against the effects of aging. As we age, our muscles naturally lose mass and strength in a process called sarcopenia, and this accelerates after the age of sixty. Folks over fifty, especially postmenopausal women suffer from osteoporosis, or loss of bone mass. Joint deterioration from osteoarthritis can start as early as our late forties and can increase with age.

Weight-bearing exercise, often referred to as resistance training—the kind that forces you to work against gravity—is the best exercise to combat the ill effects of these aging issues. We engage in many of these exercises while gardening, often without a second thought:

- Pulling weeds
- Pushing a mower
- Carrying plants and supplies
- Hauling hoses
- Digging holes
- Turning compost

Because gardening engages all the major muscle groups—arms, legs, shoulders, back, and abdomen—it also improves mobility and builds endurance. Moving from task to task improves mobility and balance, engaging the proprioceptive nerve endings that give us a sense of where our body is positioned. According to a study published in the National Library of Medicine, significantly fewer gardeners than nongardeners reported a fall in the past two years.[1]

Natural movement is mobility, and mobility improves flexibility. There is evidence that maintaining flexibility is a key part of longevity. Turns out that stretching your body, like gardeners do, stretches the years, too.

DEXTERITY

As you followed me through the garden, I used my hands to harvest pea pods, pinch out basil plants, pick blighted leaves off tomato vines, pluck berries, pull rhubarb stalks, yank out weeds, and shell peas. While gardening, your hands are moving without a thought. You are much more aware of the larger

Janet Robidoux staking a cleome, one of her 400 annuals; around the time of this picture, she and her twin sister, Janice, downsized to that number from 1,000.

muscles you are using for things like digging and lifting (and sometimes they scream at you). But when you sow seeds, deadhead flowers, or snip herbs, you might not realize you're giving your hands a workout. Those precise movements increase dexterity and hand strength, which diminish with age.

It turns out that working with your hands is good for your brain, too. A large portion of your brain is dedicated to the voluntary movement of your hands. Whether it's through knitting, woodworking, painting, or sowing seeds, using fine motor skills stimulates the brain more than pushing buttons or swiping screens. Handwriting lights up the brain in ways that typing doesn't. Hands-on activities like these are associated with cognitive benefits, including improved memory and attention span.

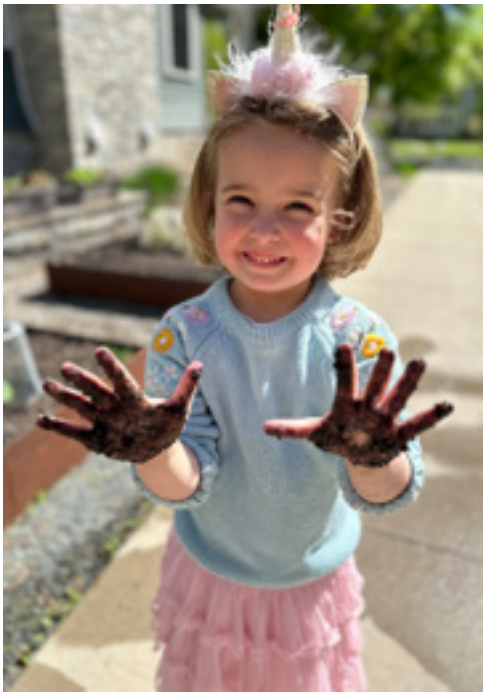
Some researchers credit the rhythm and repetition of these activities for calming anxiety and reducing symptoms of depression, rather than the actual hand-mind connection. It might come down to this: When your hands are busy, your brain rests. Who hasn't zoned out while pulling weeds or perhaps channeled some anger into them, too?

Kelly Lambert, a professor of behavioral neuroscience at the University of Richmond who studies effort-based rewards, has another theory. She sees "the connection between the effort we put into something and the reward we get from it" and believes that working with our hands gives a sense of accomplishment. In other words, when we create a drawing or a sweater by hand it's a uniquely gratifying experience, a sort of handmade happiness. The same can be said for a garden.

EMOTIONAL REWARDS

When I'm having a bad day or the news is overwhelming, I step out to the garden. I imagine you do, too. We don't need an expert to tell us the garden will sooth our woes, if only for a moment. Yet it's intriguing to know how that occurs.

When the dentist tells you to go to your happy place, science says there's a 90 percent chance you'll imagine a scene from nature—the beach, the forest, or, for many of us, the garden. *Biophilia* literally translates to "love of life" and can be described as the desire to commune with nature and living things. Humans have a tendency to be drawn to their natural surroundings, where they find a sense of well-being and emotional connection. Witnessing nature's life force in green spaces is to feel like a part of something bigger than ourselves.



My little neighbor Nora's muddy fingers and smile prove how good soil can make you feel.

When I first saw the claim that soil was a natural antidepressant, I was skeptical. After some digging (ha!) I found the dirt. Exposure to soil microbes, specifically *Mycobacterium vaccae*, activates your brain cells to produce serotonin, the feel-good hormone. This chemical found in the soil can reduce stress and improve mood. You don't even have to dig in the dirt to reap the benefits. Simply sitting in or walking through a garden lowers cortisol, the primary stress hormone, and produces a sense of calm and well-being. I'm convinced of this every time I do my morning garden stroll.

Like everyone, I can get dragged down by the weighty burden of world events. However, I'm always an optimist in the garden. It doesn't take much to sway my mood: a perfect ruffly head of lettuce, a thriving new plant, or whenever that frog plops off the lily pad in my garden pond. Feeling optimistic in a garden seems natural, since gardening is a forward-looking pursuit. This is embodied in the gardener's mantra of "next year." Around the time I'm eating my first garden-grown salad or watching bees buzz around a new flower, I'm already thinking about what I'll do in the garden next year, whether it's repeating my results with a particular plant variety or improving upon a growing method. I'm motivated to keep growing in more ways than one.

The Japanese concept of *ikigai* refers to having a reason for living, a sense of purpose, something to get up for every day, and it is believed that this sense of purpose and value is the key to a long and happy life. Chances are you find your ikigai in the garden.

BRAIN HEALTH

When you walked through the garden with me on that glorious June morning you saw the culmination of hours and hours of planning and problem-solving. Every winter, you can be sure I'm combing through seed catalogs, looking back at photos of my past designs, recalling memorable harvests and dinners, dreaming and debating with myself, and sketching and scheming to create the next vision for my kitchen garden. This special garden is not only bountiful, it's also beautiful. We have a compressed season in Minnesota, and I have only a few chances to get it right. The rest of my landscape is more forgiving; however, I'm thinking about that, too, pondering ways to make it more sustainable and easier to maintain.

Building and tending a garden involves a series of decisions: how to help your plants thrive; sun or shade; acidic or alkaline; loam or clay; wet, dry, or somewhere in between? You consider color, shape, size, and texture when it comes to flowers and foliage. You look for advantages in microclimates. You design and think in 3D to make your landscape come to life in a way that's visually appealing, as well as sustainable. You strive for "the right plant in the right place."

Christine Scotillo choreographs her garden.

A friend of mine, Christine Scotillo, is an incredibly talented gardener who draws on her background in dance to "choreograph" her plants to achieve stunning results—a brilliant stretch of the imagination. Brain exercises like this help to improve and preserve cognitive function.

My garden is many things for me: a sanctuary, a playground, a grocery store, a

chapel. It's also a laboratory. I'm always observing, researching, and experimenting, trying out new things, watching and wondering. Isn't it funny how the garden relaxes us and stimulates us at the same time?

BETTER NUTRITION

Remember the fresh produce I harvested on that quick jaunt through my kitchen garden? There's a lot more where that came from. Depending upon the month, I'm picking leafy greens and lettuces, tomatoes and peppers, assorted root vegetables, summer favorites like corn and melons, and all manner of herbs, not to mention the fruit growing at the edges of my property.

It's no secret that homegrown produce tastes better than store-bought. A lot of that has to do with the short distance it travels from the veggie plot outside your door to the kitchen table. Food that travels long distances not only loses texture and flavor but also nutrients. It can't get any more local than your own garden.

As people age, the number and size of their taste buds decline, affecting their sense of taste. It makes sense to eat better- and brighter-tasting fruits and vegetables grown in your backyard, and to spice them up with an abundance of herbs (which would cost a fortune at the store.) In addition, the visual appeal of a colorful plate helps to stimulate appetite. Vegetables of all colors contain phytonutrients, compounds that give them their color, taste, and smell. These potent compounds help fight cancer and heart disease.

So many folks dread the question, "What's for dinner?" I turn the tables and pose the same question to my garden. It rarely fails to come up with a delicious solution. I love it when I can put together a meal without a trip to the grocery store. I admit feeling a bit smug when I walk out there with my clippers and basket, even if it's just to snip a few chives for baked potatoes. Fresh food right at your back door makes it simpler to skip fast food and highly processed meals. It makes "Meatless Monday" so much easier for those who celebrate it.

My father-in-law, Joe, picking raspberries with me.

Experts observing countries with a high number of centenarians report that gardening and the resulting "plant slant" of their diet is a major reason for their long life spans. Dan Buettner, the face of the Blue Zone phenomenon, posts on social media that gardening is a "nudge" and explains that "you plant the seed, and then you water it, weed it, and eventually eat this organic vegetable that you must like because you planted it."

Gardeners are more likely to try new foods and have a more diverse diet. Every year, I challenge myself to grow something new or new to me. Recently it was lima beans (butterbeans to those of you down South), and, lo and behold, I liked them. Fresh from the garden they were so much better than the mealy ones I'd been served elsewhere. I even made hummus from them.

SOCIAL CONNECTIONS

It is said that humans are social animals. People associate belongingness and acceptance with a sense of security. Laughing with a group of acquaintances or confiding in a close friend gives your brain a hit of dopamine and encourages you to keep seeking out social opportunities. Social connection is essential to successful aging. Friendships can lower blood pressure, reduce inflammation, and improve cardiovascular health.

At 82, Sandra Mangel, whose motto is "Just keep going," started a garden design business. Passersby ooh and ah over her gorgeous garden.

There are a number of friendship levels: acquaintances, casual friends, work friends, close friends, and lifelong friends. And don't forget social media friends. We need all kinds. Some of those friendships depend upon shared activities, others certain locations. Close friends are the ones you choose, and lifelong friends might not be in your life every day, but you can pick up where you left off with the greatest of ease. Gardening friends can overlap all of those categories and might shift with time. Friends on social media sometimes become friends IRL ("in real life").

I find my tribe in fellow gardeners. Like many writers, I'm an introvert. I'm completely happy in my own world. I have to push myself to socialize. I can feel awkward in a group of people. I might panic at parties, but I can speak about gardening to a room of 200 people without a problem. I credit gardening as that bridge that connects me with other people. It's my safe space.

In spite of being an introvert, I really like sharing my garden with other people. I'm fortunate to live in a very walkable community. I love the unexpected, organic conversations that happen with people of all ages who pass by my garden while I'm out there weeding or planting, even if it's only to commiserate about the rabbits. The neighborhood kids raise monarchs and know they are welcome to pick milkweed foliage for their hungry, hungry caterpillars. When passersby are amazed by the masses of monarch butterflies on the meadow blazing star (*Liatris ligulistylis*) I become a sidewalk educator, evangelizing and extolling on pollinators. I treasure all of these interactions.

Gardeners often work alone in their gardens, but that shared interest gathers people together in countless ways. Seeking some garden friends? Look to plant societies, garden clubs, service days, plant swaps, garden tours, and, my favorite, Extension Master Gardeners.

FAITH AND RITUAL

Regardless of their spiritual bent, many gardeners go beyond growing pretty flowers to seek deeper meaning in their gardens. Any type of gardening takes faith: that complete trust, the expectation that a tiny seed will germinate and flourish, that an acorn will someday provide shade, that food plants will nourish a family. And then there is the other type of faith, faith in a higher power that gives one the strength to withstand personal or global turmoil. Gardeners of faith can find meaning and metaphor in the natural processes and beauty of nature.

Another form of spiritual practice is ritual. It's even found inside the word *spiritual*. Ritual is different from routine in that it is done with intentionality and is often imbued with symbolic meaning and sometimes ceremony. An example can be found in the way I prepare my kitchen garden beds each spring. I routinely add manure, compost, and organic granular fertilizer. In

A goddess statue in Community Peace Gardens in Minneapolis.

this way, a yearly routine is tied to best practice, to productivity. After I've dug it in and turned the soil just enough, the silent thanks I add is a small ritual.

Rituals can mark religious events, family milestones, or annual gatherings. They can celebrate seasonal events in nature, like the equinox or phases of the moon. In the garden they can be enhanced with art, song, or aromatherapy, with offerings like mandalas made from garden materials, herb bundles, altars, chants, and singing. The grounding effect of ritual can be a reassuring practice that gives people predictability and consistency in times of uncertainty, which in turn lessens stress.

IMPROVES SLEEP

Daytime hours spent in your garden will help you sleep better at night. Obviously, fresh air and exercise give you that "good tired" sensation. In addition, all of that time outside increases vitamin D exposure, which helps regulate your wake-sleep cycle. Time outside in natural sunlight also helps to reset your circadian rhythms by influencing the production of hormones, such as melatonin and cortisol, which regulate sleep and wakefulness. The end result: a well-rested gardener ready for another day in paradise.

Aging as a process is biological, but also social and psychological. It can deeply affect our hopes and dreams for the future, adding further insult to the physical changes we undergo. The best way to fight ageism is to be aware of it. Once you see it, you'll be able to resist its gloomy prognostications. I caution you to be on the lookout for any negative stereotypes that

A Different View on Aging

Old doesn't look like it used to. The boomer generation, those born between 1946 and 1964, has seen to that. You are most likely the ones reading this book. While our generation has not gone quietly into old age, it is the one most singled-out for the barrage of anti-aging messages that plagues the marketplace and the media. It is hard not to think badly of your advancing years in the face of this bias.

A weathered bench reminds us of terms used to describe aging.

I spent a lot of time pondering how to describe people "of a certain age" in this book. There are many options with positive connotations: older (it is what it is), mature, senior, wise, seasoned, venerable, gray. And, of course, there are plenty of less-than-complimentary descriptors: decrepit, elderly, over-the-hill, ancient, geriatric, grizzled (although I kind of like that one). I ended up using the more positive ones interchangeably, but I think "older" is the most straightforward. I like the idea of saying "growing older" because it implies growth is still possible. I also like the term "gracefully aging gardener" because I feel it imparts a sense of dignity and optimism (and I love alliteration). These and other expressions support the growing movement toward the idea of positive aging.

dampen your enthusiasm for gardening, your gardening future, and life in general. In the end, there's much to the saying "It's not how old you are. It's how you are old."

Our Lives Change

Big changes happen starting in your sixties. These developments might have you rethinking your gardening goals as your circumstances and priorities undergo a sea change. It's not only aches and pains. Transformational shifts, such as an empty nest, career changes, aging parents, marriage and divorce, illness, death of a spouse, retirement, and grandchildren, can all affect your gardening future.

Your garden might take a backseat to any of these factors. Whether it is permanent or not depends on your situation. Yet for many, gardening can be the life preserver that keeps them afloat through these changes. If you're reading or just perusing this book, you haven't given up on gardening completely; your next step could be seeing how it looks in the future.

RETIREMENT RESET

For many, retirement is a time of personal growth, an opportunity to pursue hobbies, travel, spend more time with family, and seek out new experiences. For some, retirement means a loss of identity and purpose, periods of boredom, loneliness, and depression. Financial factors play a huge part. People miss their old routine and work friends or feel aimless without the structure of schedules, meetings, and appointments. Whatever your situation, it can take time to find your rhythm.

My husband, a man with a busy mind and boundless energy, was adamant he didn't want to wake up and wonder what to do that first day of retirement, so he made a plan. For decades I had driven him to the airport with his bag and briefcase as he traveled the world for work. But when I drove him to the airport on that first day of his retirement, he had only a small backpack. For the next month he walked 500 miles (805 km) across Spain on the Camino de Santiago pilgrimage trail. He returned with blistered feet but felt a "reset" coming back to his family and hobbies with a new vigor. Not everyone can pick up and do that, but diving into a new activity, such as a gardening project, might be just the ticket.

Dean Erickson gardening with his granddaughter Ida. *Photo courtesy of Donna Erickson*

GARDENING WITH GRANDCHILDREN

Grandchildren are a game changer. They are a busy group, with days full of play dates, soccer games, music recitals, swimming lessons, you name it. Modern grandparents aren't sitting around

either; they are just as likely to take the grandkids on a Disney cruise or a ski trip. One of the gardeners you'll meet in this book hosts an annual "cousin camp" for her grandchildren, complete with outdoor tents and activities. According to AARP, 80 percent of grandparents feel it is important to live near their children and grandchildren. Nowadays it's not unusual for grandparents to move for that reason.

But relocating to another city later in life requires courage and flexibility. And moving to a smaller home, condo, or apartment amid plans to spend quality time with grandkids can impact your time and energy, not to mention your space allotted for gardening. However, gardening can also play a role in making that time with family enjoyable. According to experts, it is important to find your own social life and activities apart from the grandchildren, to maintain your independence and family harmony. And don't underestimate the power of sharing the garden with the grandkids. So many of us found our passion for plants right there at our grandparents' sides.

Others might find themselves ready to transition into independent living at some type of senior residence. Many of these facilities have gardening opportunities and gardening programs designed to fit the needs of older adults. In fact, continued contact with nature should be at the top of your criteria when choosing to make such a significant move.

Gardens Change

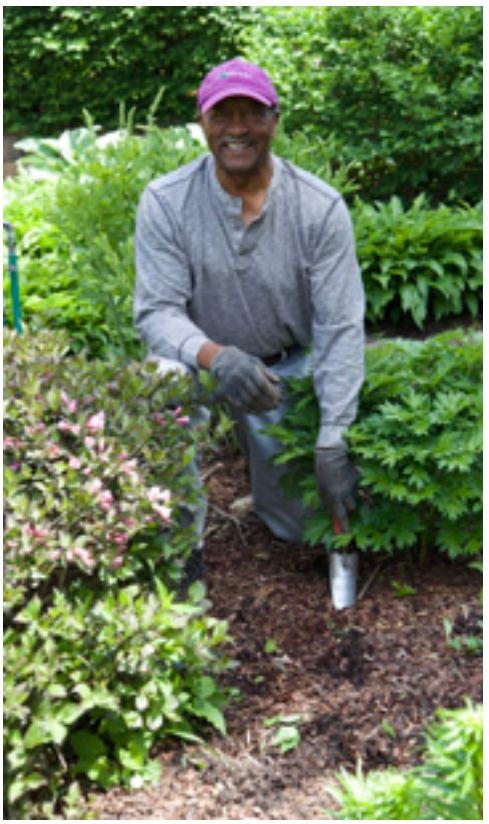
Gardens are constantly changed by seasonal fluctuations, plant maturity, garden trends, gardeners' choices, and, in recent years, climate change. Trees are probably the most visible symbols of change; they grow up, they come down. Our neighbors love to tell the story of the tiny maple sapling they received as a promotional gift from their bank. A mere sprig in a can at the time. The story is even sweeter when told while we sit in the shade of that towering tree during impromptu happy hours.

All that's left of a beautiful bur oak after a storm—a big change.

Down the street, my neighbor Broadus Miller's garden has gone through big changes. He lost several boulevard trees from storms and disease, leaving his beautiful shade gardens exposed to the southwestern sun and causing him to reconsider his plant selection. I pass by this garden all the time on dog walks, and I marvel to think he began 34 years ago with no gardening experience. The yard had only three or four plants. Starting from scratch, as he tells it, "I made mistakes along the way, lots of them, and just learned, loved it, and kept learning."

Replacing those lost trees, Broadus decided to go smaller—our block already has lots of huge trees. Now in the spring, I look forward to seeing his new pear tree and new serviceberry tree full of white flowers. At 78 he now hires help for some tasks. As for growing older, he says, "I will do as much as I can as long as my body allows it. I'll stay here as long as I can and keep the garden."

Older gardens can also suffer from tree root intrusion, soil compaction, overgrown shrubbery, poor soil quality, unwanted weeds, invasive species, and more. Hardscape could be outdated or failing. Chapter 2 discusses how to evaluate problems like these that are common in aging gardens.



Broadus Miller grows more sun-loving plants after the loss of two large trees.

Gardening in a Changing Climate

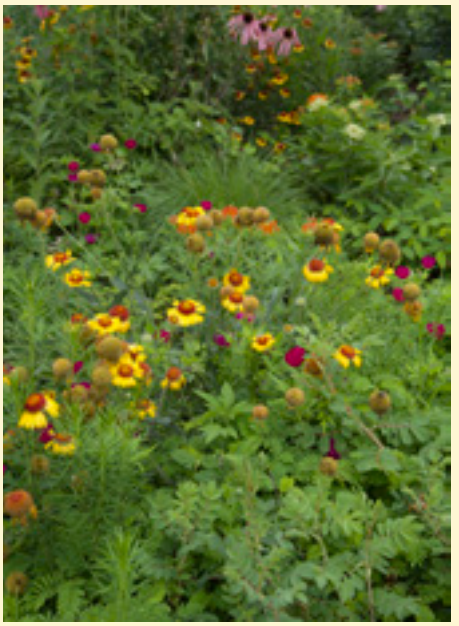
Gardeners have seen climate change coming for quite a while. Perhaps you've already noticed effects in your garden. Some are subtle, some more sudden, many are disturbing—lilac bushes reblooming in August, a sparse peach harvest from lack of chilling hours through dormancy in winter, a scarcity of bees. These are just a few of the signs you witness as erratic weather becomes the norm rather than the exception.

The symptoms of climate change will affect everyone: rising temperatures, increased pest populations, more plant diseases, heat waves, changes in precipitation patterns, more severe

A Brief History of Gardening

It's interesting to see where today's gardens fit into the long trajectory of gardening history in the Western world. Think the concept of outdoor garden rooms is new? The Romans did that in Italy as early as the year 43 AD, creating courtyards featuring plants, fountains, statues, and seating. Jumping ahead a bit, we'll start our timeline in England, where gardening was regaled by architectural historian Nikolaus Pevsner as "Britain's greatest contribution to the visual arts." If social media influencers had existed back then, these are the gardens they would be posting from.

Late 1400s–1600: Tudor gardens are designed to impress, with intricate knot gardens and labyrinths.



Naturalistic planting with gaillardia, coneflower, and wine cups in a St. Paul front yard.

1600–1700: Stuart era gardens are characterized by patterned plantings intended to be viewed from above on large terraces.

1700–1800: Early Georgian gardens embrace antiquities with lots of temples, statues, and grottoes in formal designs.

Late 1700s–mid 1800s: Late Georgian and Regency gardens, influenced by landscape architect Capability Brown, feature wild, natural spaces like woodlands and meadows that emphasize the "picturesque."

Meanwhile in America . . .

1700s: Early colonists plant food crops for survival, using seeds brought from England, while also learning to grow indigenous plants like tobacco, squash, and corn.

Early 1600s–1865: Slaves tend crops for landowners and grow their own gardens for food, a sense of autonomy, and pleasure.

Early 1800s: As pioneers head west, gardens are grown close to the house to protect crops and facilitate harvesting; food and medicine plants are grown in "cottage" and "kitchen" gardens.

Mid 1800s: Ornamental gardening begins in earnest.

1860: Pyrethrin, derived from chrysanthemums, is first used as a pesticide.

Late 1800s: Victorians grow lawns, plant "carpet beds," and covet exotic imported plants brought from foreign lands by intrepid

The author's kitchen garden is a mix of vegetables, herbs, and flowers.

plant hunters in the Golden Age of Botanical Exploration; greenhouses and conservatories become popular.

1858: Central Park, designed by Frederick Law Olmsted, makes nature accessible to the residents of New York City.

Early 1900s: Home gardeners go for larger lawns, perennial beds, and foundation plantings.

1943: During World War II, 20 million "victory gardens" supply 40 percent of the nation's produce.

1950s: Gardeners increase their use of pesticides; Astroturf is invented at Monsanto and given the name "ChemGrass."

1960s: With increased leisure time, gardens become an extension of the home.

1970s: Organic gardening and edible landscaping start to make inroads as Americans celebrate Earth Day for the first time on April 22, 1970.

1980s: Need for water conservation drives xeriscaping, low-maintenance gardens, and drought-tolerant landscaping.

1980s–90s: The New Perennial movement, or New Wave movement, emphasizes naturalistic planting styles, celebrating the entire life cycle of plants and embracing a more wild and ecological aesthetic; container plantings proliferate in small urban gardens.

2000s: Gardens go full circle; native plants are used to create wildlife and pollinator habitat and edible gardens incorporate vegetables, flowers, herbs, and fruits, sometimes in the front yard.

2025: Maximalist gardening, or chaos gardening, becomes a movement. (Or is it just a trend?)

storms, and extreme weather events. All of this will continue to alter growing conditions that people have depended upon for centuries. Indeed, our entire physical and societal infrastructure was developed around climatic patterns that no longer exist.

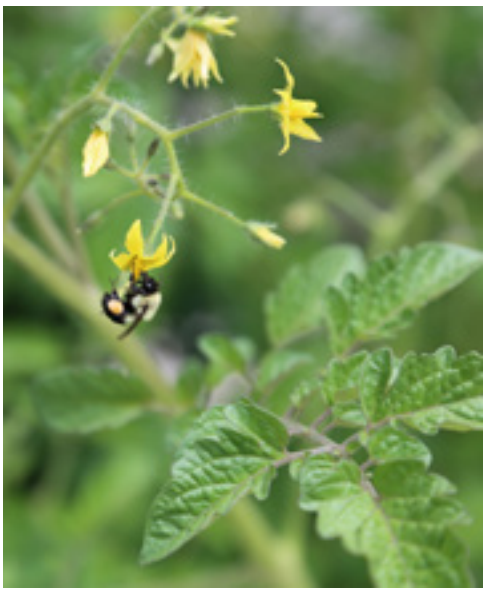
POLLINATION AND HEAT STRESS

A warming climate has already made itself known with average temperatures creeping upward every year. Heat stress affects plants in multiple ways, and the negative consequences for pollination are especially concerning. According to the University of Maryland Extension:

> *All fruiting plants have an optimal temperature range for the pollination and fertilization process. High temperatures can reduce pollen production, prevent anthers from releasing pollen, kill pollen outright, and interfere with the pollen tubes that serve as conduits for uniting sperm cells and eggs (fertilization) inside undeveloped seeds (ovules). High temperatures can even injure flowers before they open. Night temperatures are increasing at a faster rate than day temperatures as a result of climate change and seem to be most responsible for these pollination problems.*

Looking at pollination problems from another angle, consider the effect on America's favorite backyard vegetable crop, the tomato:

- Prolonged daytime temperatures over 90°F (32°C) and nighttime temps above 70°F (21°C): Pollen production decreases, resulting in poor flowering and reduced fruit set.
- Prolonged daytime temperatures of 95°F (35°C): Tomatoes stop producing red pigment.
- Prolonged daytime temperatures of 100°F (38°C) and nighttime temps of 80°F (27°C): Ripening stops.



Bumblebee pollinating a tomato plant.

Poor pollination on other heat-stressed vegetables is evident in partially developed zucchini with

yellow withering at the flower end and undersized cucumbers with a stunted, pointed tip. Some varieties will fare better than others. The challenge to find more resilient plants will take on more urgency.

Climate change throws ecosystems, evolved over thousands of years, out of synch. This is seen when flowers and insects that have adapted to bloom and emerge at the same time fail to do so. This can have a profound effect on species like specialist bees that collect pollen from a single plant species or a limited number of plants. That symbiotic relationship is so finely tuned that the bees' mouth parts have evolved to reach that unique nectar source. If "their" flower doesn't bloom as they emerge, they are out of luck, and that flower will remain unpollinated. Sometimes specialist bees remain dormant in their nest if that flower isn't blooming at the right time, hoping it does the next year.

Specialist bees are referred to as *oligolectic*, from the term "chosen few." For example, cellophane bees (*Colletes aberrans*) feed only on prairie clover. Sunflower mining bees (*Andrena helianthi*) feed their larvae with only the pollen of members of the *Helianthus* family, such as sunflowers, Jerusalem artichoke, and coneflowers. Thankfully, there are more generalist bees that are able to forage upon a large number of floral options. Yet, specialists are especially vulnerable and deserve our attention when planning habitat. As you can see in table 1.1, their specialty is often suggested in their name.

Table 1.1. Specialist Bees and Host Plants

Bee Species	Host Plant
Bee balm fairy bee (*Perdita gerhardi)*	spotted beebalm (*Monarda punctata*)
Bellflower resin bee (*Megachile campanulae*)	bellflower (*Campanula* family)
Eastern willow mining bee (*Andrena bisalicis*)	willow (*Salix*)
Faithful leafcutter bee (*Megachile fidelis*)	daisy (Asteraceae family)
Patellar oil-collecting bee (*Macropsis patellata*)	yellow loosestrife (*Lysimachia*)
Pickerelweed long-horned bee (*Melissodes apicatus*)*	pickerelweed (*Pontederia cordata*)
Waterleaf mining bee (*Andrena geranii*)*	Virginia waterleaf (*Hydrophyllum virginianum*)

* These bees are unique in that they collect floral oils besides pollen.

This bag of yarn pieces represents all the worms one chickadee feeds her brood in a single day.

BIRD MIGRATION

Climate change affects the patterns of bird migration as well as breeding behaviors. Gardeners like me who rely on birds as part of their pest management strategy might one day find ourselves wondering, "Where are all the birds?" I count on chickadees to capture the cabbageworms that compete for my broccoli and cauliflower plants. A single chickadee feeds her brood up to 500 worms a day. Many birds are adapting to climate change by doing three things: moving north, moving up in elevation, and advancing their reproductive schedules. Still, that may not be enough.

There will be temporary benefits to climate change, including longer growing seasons and the ability to grow new crops in areas unhospitable to them before. And plants do grow better with higher levels of carbon dioxide, which is an effect of climate change. However, these advantages will be short-term, as harmful insects, weeds, water shortages, and heat stress increase.

Ten years ago, I wrote in *Pollinator Friendly Gardening* that a single garden acting to support pollinators doesn't move the needle, but when millions of gardeners do this it is possible to make meaningful change. Ten years later, the idea of pollinator friendly gardening is common practice.

Honeybees collecting different shades of pollen.

HOW WE CAN HELP

As we adapt and enhance our gardens to suit our changing

lives and a changing climate, there are plenty of things we can do—both big and small—to practice sustainability and help to mitigate the effects of climate change to collectively combat this crisis:

- Plant trees to support wildlife habitat; provide shade for other plants, our homes, and ourselves; and combat excess urban heat.
- Create wildlife habitat in our gardens: food, shelter, and nesting sites to help make up for habitat loss caused by development and other land use.
- Build healthy soil in your garden to enhance plant growth, reduce pest and disease problems, and manage rainfall.
- Seek out resilient plant varieties that can survive erratic weather and withstand pest and disease problems; they'll save you time, energy, and money in the long run.
- Wean yourself from peat-based products. Peat extraction damages critical ecosystems and exacerbates climate change; peat-free products can improve soil structure, provide a better environment for beneficial microorganisms, increase available nutrients, and retain moisture.
- Use permeable paving to minimize runoff, letting the water percolate into the ground.
- Grow your own fruits and vegetables or buy them from farmers markets to help local growers.

A pesticide-free garden.

GARDENER SPOTLIGHT

Meleah Maynard

It's always a joy to visit Meleah Maynard's garden, which she and her husband, Mike Hoium, have fashioned on their corner lot, a shady retreat in the middle of the city. Passersby always stop and ask gardening questions, and that inspired Meleah, a freelance writer, to write *Decoding Gardening Advice: The Science Behind the 100 Most Common Recommendations*.

Meleah and Mike moved into their house and began the garden twenty years ago, when Meleah first became a Master Gardener. They did away with the lawn and put in a path, and then started with bigger changes, like understory trees, native pagoda dogwoods, and nannyberries, all of which thrived in the shade of two huge bur oaks. Next, they built a rustic picket fence around it. Then they went looking for free plants. They were gifted, and dug up, all sorts of plants, including all of the hostas that she loves. They started filling in with plants here and there. In hindsight, Meleah considers this, "an ill-advised garden design strategy."

In my mind, the garden is a perfect success. It's such a great example of layered landscaping, a style that mimics natural ecosystems by creating multiple tiers of plants to support a wide variety of wildlife. Beneath the oak canopy the understory trees help create a lush, textured garden. For structure, they have extra-large perennials, like black snakeroot, goldenrod, and goatsbeard, throughout the garden. Wild ginger, geranium, lady's mantle, astilbe, hostas, and periwinkle cover the ground below, eliminating the need for mulch and effectively choking out most weeds. The garden shines in spring with Virginia bluebells, trillium, and uncommon plants like mayapple. All the birds and other wildlife that have made a home here seem to think it's pretty nice, too.

Walking by recently, however, something seemed off. As I got closer, I saw that one of the bur oaks was missing, and only a tall stump remained. Meleah explained the pair of oaks "sort of hugged the house," and one had developed some cracks, so they had been trying to figure out what to do. Then an August storm ripped off a huge limb and destroyed the tree.

- Switch from gas-powered tools to electric and manual to reduce noise and pollution; these lightweight tools offer ease-of-use and help older gardeners maintain independence for longer.
- Remove invasive species to give native plants and crop plants a better chance to re-establish themselves.
- Reduce water consumption to reduce stress on community resources; water more effectively—deep and infrequent watering makes plants more drought tolerant and resilient.

Putting a positive spin on this tragic turn, Meleah and Mike decided to leave the stump and do more to make it into habitat. They love how the squirrels and raccoons sit on it. They plan to bore more holes to make the stump even more welcoming for wildlife. The oak's absence has added more sun to the side yard, so they moved metal troughs there to make a "little, tiny farm" where they are growing veggies and herbs high enough to hopefully foil the rabbits. And the troughs make it easy to tend the plants without bending or stooping.

Many of Meleah's shade-loving plants aren't happy with the new exposure, and she plans to move some and give away others. They miss the shade, too: "That's been part of aging; we used to like the sun but now that we are older—we like shade."

The bur oak's demise isn't the only change they are going through. She and Mike have both retired so they have more time to garden; however, they have to travel frequently out of state to care for her aging parents. This has left her mindful about how she manages her garden for the future.

MELEAH'S TIPS

- Buying smaller plants is better because you'll save money and it's easier for the plants' young root systems to get established quickly. They don't have as much growth to support.
- Think carefully about whether or not plants need to be moved, and be strategic about it by knowing where to move plants before digging up an area.
- Protect your skin from the harmful effects of the sun when working in your garden.

- Use LED bulbs, solar-powered fixtures, and timers for outdoor lighting to conserve energy and protect wildlife from nighttime light pollution.
- Compost kitchen and garden waste to feed your soil and reduce waste sent to landfills.

GARDENERS, UNITE!

The pace at which nations and governments have moved to tackle what is called the greatest existential crisis of our lifetime is infuriatingly slow. As

lawmakers and administrations seesaw back and forth over policy, it is exasperating, leading many to feel powerless and hopeless.

But as citizens we can help to bring change by working toward a more sustainable food system, helping people reconnect with nature, and building community. Meaningful action can be as simple as growing herbs in a planter, using a few more native plants, removing some lawn, or volunteering at a school garden:

- Create beauty and biodiversity in your garden to boost your mental health while fostering an environment that helps plants and animals thrive.
- Reclaim land for community garden use to improve residents' physical and mental health by increasing food security and creating social connection.
- Share gardening knowledge to ensure that people have successful gardening experiences and positive results.
- Show respect for gardening traditions and practices while providing science-based knowledge for an all-around better outcome.
- Share seeds, plants, and produce so that everyone benefits from the garden's bounty.

You don't have to wave a protest sign; your gardening efforts toward a more sustainable future will speak for themselves.

Community garden, SPROUT NOLA, New Orleans.