Farming Is Not Big Gardening

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A Story about Modern Production Agriculture in the United States

By

Thomas C. Mueller

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I sincerely thank my wife and my children for providing ideas and critical reviews of this book. I also thank several anonymous technical reviewers for providing technical correction where needed.

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PREFACE

Doubting Thomas said "Unless I see the nail marks in His hands, put my finger where the nails were, and put my hand into His side, I will not believe."

Whether you believe this story or not, I provide it here as an illustration of others' doubting. Many Americans, Europeans, and Japanese simply do not trust groups they previously thought were trustworthy. Phrases such as "I'm from the government and I'm here to help you," "I did not have sex with that Lewinsky woman," "I'm not a crook" (Richard Nixon, in case you did not know), and the list goes on and on. With respect to this topic, the only absolute truth that I can be sure of is that all people lie; people have an agenda.

Trust can be defined as "firm belief in the reliability, truth, ability, or strength of someone or something." But within this definition there still is an essence of subjectivity and doubt. My wife and I have watched British murder mysteries on Netflix, including for example *Poirot* and *Midsomer Murders*. In these stories detectives search for a motive or reason for each murder. Apparently, there are three basic motives for murder: money, revenge, and sex. While lying is not the same as murder, the same motives may be involved in why people lie.

I have learned that the best long-term policy is honesty, although this can be difficult. As a newly married person years ago, my wife and I were still getting to know each other. One night she prepared a new recipe of honey-glazed chicken for dinner. To my taste it was not very good. When she asked me about it, I lied and said, "This is very good, Honey," (to spare her feelings). Just a few days, later she made the same dish again. When I was honest about my true opinion of the dish, she was hurt. We should always try to be respectful of other peoples' feelings, however, insofar as it is possible, honesty is the best policy.

I am asking you to trust me.

This book is about food and what we eat. My view is that what some people believe about food must come from fairy tales, since it is ridiculous. I also know that "scientists" each have their own agenda, and they may self-select

data or ideas to support the view that their specific research will save the world, stop global warming, cure cancer, or whatever else they have to say to get their project funded. In some cases it may even be true! If you think academics are "pure as the wind-driven snow," you simply do not know any college professors. (I can say this since I am a college professor.)

My goal with this book is to make you laugh (some) and to share with you some ideas about farming, food, and the myths and fables that surround this important topic. In the spirit of full disclosure, I do not purposely set out to perturb you, although to be honest that will probably happen. As a "foodie," you simply may not understand the difference between spirit-filled beliefs and cults. For you nerdy intellectuals, I do not care how many scientific papers/studies or statistics you bombard me with: I simply do not believe you. My name is Thomas, and there was this guy in the Bible named Thomas, and he doubted others until he was shown absolute proof (to him personally), and so do I (please see previous page for more details). I have used this saying many times in my life, "It is nothing personal, but my name is Thomas, and I simply do not believe you." (It can be quite comical to see the look on scientists' faces when you doubt their cherished views.)

To you, the reader of this book; firstly, I hope you enjoy it; secondly, I hope that you believe me and that you trust me to share an informed perspective on a topic of great importance to all of us.

Thanks for reading.

Thomas C Mueller

CHAPTER ONE

INTRODUCTION

People believe things for a variety of reasons. I'm always amazed how a person's perspective dramatically affects what they see. I always find it amusing when people say, "I have no bias," because everybody does. In my immediate family, there are several rabid college sports fans. To watch the game with them reveals that different people can watch the exact same event and see something completely different. In my experience, many times people see what they want to see. To use a line from a movie called *Second-hand Lions*, the actor Robert Duvall says, "Something doesn't have to be true for you to believe it. If you want to believe in something, just believe it."

The Internet is a great thing. It is just not always factually true.

I wrote this book to provide a viewpoint on agriculture in the United States, something I know quite a bit about. Disclaimer: I freely admit my view is not the only valid viewpoint, but I offer the suggestion that I might know more about it than some. I grew up on a farm in Illinois, I worked for several companies selling the supplies farmers need to grow their crops, and I have 3 college degrees in agriculture: Bachelor of Science (BS) from the University of Illinois in Agronomy (tell me if you have ever heard of that degree), Master of Science (MS) from the University of Kentucky in Crop Science (as opposed to Crap Science, which specializes in fertilizer), and a Doctorate of Philosophy (PhD) in Crop Science from the University of Georgia. I remember my dad commenting and telling the story to other people, "Lemmie get this straight, Son. You took four years for your BS, two years for your Masters and three years for your PhD. So nine years of college… Son, I believe you are educated beyond your intelligence." Note: having worked with many PhDs over the course of my adult life, I can absolutely agree with my dad on this matter. Besides my formal education I've been involved in agricultural research and teaching undergraduate and graduate classes for more than 25 years. I work with the crops of corn, soybeans, wheat, rice, canola, cotton, tomatoes, and

vegetables. I have also conducted research in turf, pastures, rights of way (think roadsides and power lines), and tried to kill poison ivy plants. I've traveled to five of the seven continents and visited farmers on each of them, and many times I am asked to speak at meetings concerning agriculture in the US.

I've also eaten almost every day of my life.

Food and its production is NOT the same as any other commodity. A proverb from an unknown (to me at least) source goes like this: After one day with no food, a person will ask for food. After two days with no food, a person will beg for food. After three days a person will steal for food. After four days without food for himself or his family; a man will kill for food. Using this analogy, we are five days away from anarchy wherever humans live at any point in time. I believe many of the "political" revolts in the last few years (for example, the Arab Spring) happened after food costs greatly increased and food availability decreased. I believe it is safe to say that hungry people will riot more easily, since hunger is a powerful motivator.

Notes on this book: I have a few references to other books listed as I go along, but this book is not fully cited. You either believe me or not. I invite skepticism, but I hope you like reading this tome.

I realize people of various views will (hopefully) be reading this book. An example of a large dichotomy is those that believe some sort of *guiding hand* "created" our world and us. Another view is that our planet coalesced from matter, asteroids brought water to our young planet, various processes occurred so that humans evolved into our current state. At times through this book, I will denote these as a dual nomenclature, something like created/evolved… since no one can prove which pathway is correct. (Would be nice if we could to do an experiment on that, but with only one Earth, I'm not sure how to conduct that research).

I guess people write books for a wide variety of reasons. I have written many shorter pieces of prose, often highly technical in nature, but this is my first attempt at reaching a broader audience. I was reared on a farm in a very rural, isolated, back-woods part of southern Illinois, in a town that you never heard of. I used to tell people that to get to where I am from originally, you go to the sticks and then go a few more miles, and that's where I'm from. From the house I grew up in as a small boy, you can look straight south and see a massive smokestack from a recently constructed

coal-fired electrical generating plant. There is a concept shared by many Americans that when they don't want something close to them called not in my backyard (NIMBY). Why is this coal-fired power plant there? Because nobody who lives there had the ability or desire to stop it. It also sits on top of a large coal reserve and so it is easier to move electricity rather than the coal.

Growing up in a rural farm-based economy I was intimately connected with agriculture, farmers, and food production. I had cousins that came from the city to visit the home farm, so I knew that there was this other group of people out there (we called them city slickers) who didn't really understand farming. As the population of the United States becomes more and more urban with no family connections to anybody on a farm, the disconnect between the people who eat the food and the people who grow the food widens. People in the cities are ignorant of what farmers do. There's nothing inherently wrong with this. Many people are ignorant on a great many things. I really don't know how my cell phone works, but it sure is nice. I'm not sure how the traffic lights know how to turn different colors and how they don't all turn green at the same time, but I'm glad that that doesn't happen. The difficulty is when people who are ignorant about something, like food and its production for example, make decisions about what type of food they are going to eat and what type of food they are going to buy. This is why I wrote this book. I hope to make a little money on it too, but don't tell anyone.

I also wrote this book because it is something I've wanted to do and my wife (who is smart and beautiful, although one must question her judgment on "mate selection") supported this endeavor. I hope you enjoy reading it (it was a pain to write) and hopefully you may see food and farmers a bit differently.

CHAPTER TWO

ALL CROPS ARE GMOS

First off, before you yell at me, I like dogs. We had many dogs growing up on our farm. Some were for hunting (rabbits and raccoons mainly), and others were for pets (for protection-our dog named "Pal" was one half German shepherd and half full size collie… a big dog). I like dogs. Dogs hold a special place in our American culture, being held in higher status than other species. Dogs are often considered a family member, and when one passes it is a time of sadness for that family. Some dogs are gifted to directly help us humans as therapy support dogs, and these dogs can bring great joy and happiness. I believe dogs go to heaven. Maybe not all of them, but the good ones do.

All dogs have 78 chromosomes. Humans have 23 sets of two for a total of 46 chromosomes, for reference. All dogs are descended from a common ancestor, more or less a wolf. Over thousands of years humans selected various traits in the puppies, such as size, speed, disposition, color, and so on. The humans imposed a selection pressure and thus genetically modified the dog species. As different dog breeds are not the same, they are genetically modified, genetically engineered, selected, bred… Pick whichever verb you want. The original "type" still exists, but many current dogs often bear little resemblance to the ancestral prototype.

Crops are the same.

Crops grown for energy (corn, wheat, rice, potato, etc.) or for protein (soybeans, dry beans, etc.) have been selected over thousands of years by our human ancestors. For example, a certain stalk of "wheat" yielded more, tasted better, or survived a drought (or another other stressor), and so the "farmer" saved that seed and planted it next time. Over many selections/generations, the crop was genetically modified. If we fast forward to more modern times, scientists can take genetic material and insert that material into an entirely different species. Genes from bacteria can be placed into a plant. Not delving into the technical specifics of how this is done, the resulting final plant type is called "transgenic." I believe

that the real issues/concerns/ignorance that most people have about GMO/GE (genetically engineered) crops actually relate to transgenic plants.

The truth is that "heirloom or heritage" variety vegetables are genetically modified (GM), compared to original types. In reality, lots of "bad" genes/traits have been bred/selected out of these plants. Yet, consumers do not fear GM heritage vegetable varieties. Now, why is that? As traits are selected via "conventional" breeding techniques, positive traits of interest often provide a direct benefit to the consumer, such as taste, quality, and aesthetics. In contrast, most transgenic crops provide only an indirect benefit. For example, transgenic crops that tolerate post-emergent (after the crop has emerged) glyphosate application have been a huge benefit to farmers, but the consumers derive no direct benefit. Glyphosate is a herbicide used by many, with one of its tradenames being Roundup. Maybe you have heard of it? Other transgenic crops that express a *Bacillus thuringiensis* (BT) protein in their plant parts decrease crop losses due to certain types of insect pests. The use of these BT crops can greatly reduce the use of synthetic insecticides in these crops, but this is of no direct benefit to the end consumers. The transgenic crops are said to be "substantially equivalent" to conventional varieties, and thus they are the same, at least to some people.

Later chapters will discuss in detail how some nongovernment organizations (NGOs) have vilified "big bad chemical companies" and their exploitation of sales of transgenic crops (chapter 3), how RoundupReady crops changed American (North and South) agriculture in the last 20 years (chapter 12), and how transgenic crops are viewed quite differently in the US compared to Europe (chapter 13).

I realize some of my ideas are mere semantics, with GMO/GE contrasting starkly to transgenic terminology. Recently, I have seen that the Food and Drug Administration (FDA) has proposed the term BioEngineered (BE) to label GMO food items. I am amazed at the profound ignorance of virtually all American consumers (and others around the developed world) with respect to food production and what they are consuming. For example, I see the term gluten-free posted on products that there is no chance of having a wheat protein inside of them. Gluten-free orange juice is nonsensical, but a myriad of illustrations just like this are common. In the absence of understanding, it is normal and expected to assume and to be concerned with dire, negative outcomes. This is how some NGOs thrive.

CHAPTER THREE

NGOS ARE BIG BUSINESS

Let's start with defining some terms. An NGO is a nongovernment organization, sometimes referred to as a non-profit organization. An NGO often has a 501C3 designation. 501C3 is a tax-exempt status afforded to many NGOs, which allows them to accept charitable contributions and to pay no federal taxes upon these contributions. A nonprofit organization is a group not driven by greedy capitalistic motives to maximize profits (see also 501C3).

There are many NGOs, and they differ in many ways. A small local NGO may be involved with feeding homeless people in a small town. Some NGOs have international goals and ambitions to save the planet from environmental degradation, global warming (oops, I mean climate change), or other societal issues. Some have modest finances and others have substantial fiscal resources. An NGO is a vehicle for a group of people that are concerned about a given topic to focus their efforts to improve the outcomes and lives of those affected by that given topic.

As a professional that has taken a number of formal classes on how to manage nonprofit organizations, (yes they have classes on this), I can assure you that most nonprofits need money to operate, and the more money, the better. Nonprofit organizations often have costs like employees or offices, etc. As one of my instructors succinctly put it, "No margin, no mission."

I guarantee you that virtually every NGO is sincere in their beliefs, their viewpoints, and their agenda. There is nothing illegal, unethical, immoral, or wrong in the NGOs and how they operate. Also, there is as wide a diversity of causes and interests in NGOs as there are people. I wish to share some perspectives on some NGOs to provide a background for how some of them operate. To facilitate our discussion let us contrast three types of people. The first works for a private company, the second for a university, and the third for an NGO.

The first person sells pesticides to farmers and so derives his paycheck from sales of products. He/she sells a chemical, the farmer pays for it, money flows to the company, which can then afford to pay him/her, do research, pay taxes, etc. It is a pretty straightforward flow in which the company makes a product that it sells to the farmer so that the farmer derives a direct benefit from and is willing to pay dollars for that service or product.

Now, the second person will be me personally (egotistical yes, but why not?). Dr. Mueller is a tenured professor at a land-grant university (originally these universities were established to conduct research and distribute information to enable agriculture to feed our young nation). My salary comes from state funds, and the university receives funds from the federal government based on a formula (number of farms in our state, total sales of ag products, and various other parameters). I am encouraged to solicit "external" funds from government grants, but I also solicit and accept funds from chemical companies (like person number one's) and various commodity groups (NGOs of soybean or corn farmers). These extra funds pay for my staff, my research supplies, my travel, etc, but not my salary. My salary is "hard money." My boss may not like it if I bring in no external money, but I still get paid.

The third person works for an NGO. Funding for NGOs can be highly variable. The NGO may get grant funds from a government agency (yeah, I know this sort of contradicts the name), may get money directly from private individuals, or may get money from foundations or generous corporations. You can go to any large NGO website and quickly figure out how to donate money to them. They make it easy and simple. This fundraising is key to NGO survival and success. There is nothing wrong with that, but that is the way it is. Now let us contrast the flow of money for our three amigos (not really correct terminology, but why not?).

Person #1 one sells products, money flows to company, person number one gets paid. Person #2 does or does not do his job, money flows to university, Person #2 gets paid. Person #3 solicits funds, money flows NGO, which pays Person #3. Let us examine these three money flow paths. In number one, a clear connection of how money flows: Person #1 sold the product, which will provide the benefit for which the farmer pays money. Number two, money flows independent of activity. The public has decided that the public university and faculty salaries are funded on a recurring basis. (I think this is a very good idea for personal and professional reasons). For Person #3, a private person can choose to send

money on an elective, voluntary basis. But why does this happen? The NGO must provide a compelling reason for a person to donate. To do this, the NGO must highlight/advertise/promote a problem or an issue. They have to get people (or other groups) to care about their problem/issue enough to give money. I offer the opinion that one NGOs problem can be viewed from a different perspective by other NGOs, government agencies, or companies. Also, the original NGOs pitch really must connect to the potential donor on an emotional level. Stating a cold, impersonal statistic often fails to elicit a sufficient response, while color pictures of shivering cute puppies or of malnourished starving children can open the pocketbooks and can fill the coffers of the NGO. Note: I like puppies, and I wish all humans had adequate food. I'm not saying you should not donate to NGO causes. I would offer the observation that the corporate reports of some NGOs are pretty impressive.

The Environmental Working Group's (EWG) annual report shows a total budget of ~12.6 million dollars in 2016 with three sets of offices (Washington DC, Iowa, and California). I am not sure how much the director makes, but the website is very easy to navigate. The Natural Resource Defense Council (NRDC) has an annual budget of ~140 million dollars and has offices in New York City, Washington DC, Chicago, Bozeman (Montana), San Francisco and Santa Monica, CA, as well as Beijing, China, (not too sure why "our" NRDC needs an office in China, but I did find that interesting). The budget seems pretty big to me. Based on my examination of their annual reports I could not find the various titles or job functions to show the salaries that the directing supervisors of the EWG or the NRDC make, but they do list all their public directors. Lots of smiling faces, to be sure… I'm sure the people who work there earn their pay for operating these large NGOs. I find it interesting that that is not what they highlight in the direct solicitation for funding from you, the private individual.

Concluding thoughts on NGOs: by definition, a group of people forms an NGO because a company or government agency is not fully addressing this group's specific concerns. Members of a given NGO may be very strongly connected and may be zealous in their passion of their respective concern/topic/cause. Once a given position/perspective is obtained/derived by an NGO supporter, to change that perspective is difficult or even impossible. One reason I am writing this is to provide an opinion on agriculture. I am pro-farming, pro-food, and I wish to maintain the long-term sustainability of agricultural production systems. That being said, let's talk about farming next.

CHAPTER FOUR

THE JANUARY GARDEN

In the title of this book, I use the term gardening, so I thought I might share a few ideas on what this means to me. The *English Oxford Living Dictionary* (the publisher that has agreed to publish this book is based in England, so I thought I'd better use a British dictionary to keep them happy) defines a *garden* as "a piece of ground adjoining a house, in which grass, flowers, and shrubs may be grown." This is in contrast to the definition of *gardening*, which this dictionary defines as "the activity of tending and cultivating a garden, especially as a past time." I find it interesting that a garden is defined as a location, while gardening is defined as an action that a person does.

An essential premise of this book is the contrast between farming and gardening, so this chapter is going to establish the basics for what I see as gardening, which I see as one of the most positive actions a human can possibly undertake. If, after reading this chapter, you think I'm not a really huge fan of gardening, please know that nothing could be farther from the truth. I have a small garden which adjoins my house, and I take great joy in picking strawberries and asparagus from my small plot.

Farming is a technologically challenging, complex, capital-intensive business that people try to make money at under extraordinarily trying circumstances. Gardening is a choice. A choice full of leisure and enjoyment. Gardening is a largely optional, daily activity for a person who chooses to do so. Farming is a lifetime commitment of long-term investments in equipment, expertise, and thousands of hours of effort. Gardening is a source of joy to those that choose to spend their days in their gardens. It really would not make a lot of sense if you absolutely hate gardening to spend a lot of time doing something that you really don't like. This view of gardening self-selects among the population so you don't do it, unless you really want to garden. If you don't want your grass to look good, you pretty much just have to mow it every couple weeks, and that's about all you have to do, depending on the covenant (rules) of the subdivision in which you live. Side note: many of my friends and

acquaintances know that I control weeds for a living. Given this familiarity, I frequently get requests for advice on various situations, even though there are times I have no idea what the correct answer is in the given situation. To illustrate, I got the following text last November:

"What do you suggest to kill dollar weed (*Hydrocotyle umbellate*)? We're at a friend's in Florida and their HOA (homeowners association) is after them for having dollar weed in their lawn."

Well, the truth is, I have no idea what dollar weed is or any idea how to control it. I texted them back and said I would check into it and respond later. After a few days, I contacted a former student of mine who lives in Florida, and he suggested several herbicidal options which he thought would be very effective in controlling this weed. I sent that information on to my friends, and they were pleased to help provide information for their friend. Why the person didn't just Google dollar weed control on the internet I don't know, since the information is probably right there. Maybe they just trusted my recommendation, I guess.

Another difference between farming and gardening is the cost of entry into the activity. To start a garden needs minimal resources. There are opportunities for gardening even for apartment dwellers who have a terrace or an open deck where you can grow plants in small pots and containers. For homeowners, it's simply a choice of tilling a small plot of land and planting some seeds in an area, then tending them and caring for them through maturation and picking. To get into farming, by which I mean broad acre crops that I have discussed in other chapters, takes a huge amount of capital investment, something in the order of millions of dollars. This is one reason why almost all people who are currently farming inherited a substantial amount of their capacity (land and equipment) from previous generations or relatives who were farmers. This is not necessarily bad, but this is the way it is. If a person who graduated from high school or from college decided she/he would like to be a full-time farmer, she/he would find the cost of entry would probably preclude her or him from immediately beginning a full-size farming operation. This is not unique to farming. If the same person wanted to open up a factory to produce a given commodity item, they probably couldn't borrow enough money either. Farmers operate large businesses.

Gardening is often a visual display of a person's interest and giftedness with growing plants. Although I have no statistics to back this up, (I never let the lack of data stop me from drawing conclusions before, so why

should I start now?) my guess is that there are more flower gardeners than vegetable gardeners in most cities in the United States. People will grow small plots of flowers (often referred to as flower beds), shrubs, flowering trees, ornamental trees, maybe have some flowers in pots on the porch or deck, or maybe houseplants, rather than grow vegetables that they will eat later. For one thing it's just too easy to buy vegetables at the grocery store. No tilling, planting, weeding, watering, (insert seven steps here), and finally picking the produce involved if I just go to the store and buy it; oops, I forgot, cooking it! As opposed to a visual display of beauty (I remind you that beauty is in the eyes of the beholder and to a fly a pile of manure smells wonderful), the flowers provide delight on a continuing basis. The flowers provide days, weeks, months, perhaps even years of visual enjoyment to the gardener. It also tends to be easier to find different plants that wildlife will not destroy if no one is going to eventually eat them. The gardener that is really set on growing eggplant to eat (why anyone would eat eggplant, I have no idea), knowing they have various wildlife in their garden area that will consume this plant is really going to be challenged to grow the plant to maturity and harvest it. As opposed to flowers, where you can keep planting different flower species until you find something that the deer, rabbits, etc. simply will not eat.

I'm speaking in generalizations here and there's room for flexibility in food production and gardens. Some people provide a large amount of food from their gardens that they directly consume. There's no doubt that it's a tremendous opportunity to increase food production in many urbanized countries. A small plot of land measuring only several hundred square feet can provide a large amount of fresh vegetables that (maybe) taste better than the "plastic" stuff, though it's not really plastic it just sometimes tastes that way, that you often find at the grocery store. Commercial vegetable production is based on ease of harvest, stability in transport to the grocery store, and visual appeal once on the shelf. Very seldom is the actual flavor of the item considered in the variety selection for most commercial vegetable operators, although there are some exceptions. Many times, farmers' markets and local producers are a fantastic opportunity to get better tasting produce that has not been shipped across the country, but that's a topic for another day.

An interesting phenomenon, at least to me, is the idea of micro gardens grown by people who live in small apartments or anybody else who has no ground available for a traditional "terrestrial" garden. On their exterior deck they can grow plants in soil-less plant growth media, which is easier than using soils, which might be full of lots of things that may not be good

for plant growth, for their direct consumption. The total amount of production may not be huge, but for that individual they can grow some food in which they can take great pride and delight in consuming. These efforts, under, at times, extremely urban settings, highlight to me the innate desire of humans to be connected in some way to their food and its production. A person could get those alfalfa sprouts or small leafy greens from the local vegetable market more easily than trying to grow them themselves, but yet it is the process and the pride in the success of the process that drives some people, albeit a minority, to endeavor to grow some food on their own.

I used the term the "January garden" earlier. In my experience, the January garden phenomenon is largely caused or inspired by seed catalogs. I received my Burpee seed catalog a few days ago, as I am writing this in late December. Oh! The images of these of fruits and vegetables and flowers! How beautiful!!! How gorgeous! Side note: I find it interesting the sizes of the fruit are so precise, the eggplant is 3.25" x 7.5" at maturity, not 3 x 8" or up to 7 inches. So let's contrast the "January" garden with a more realistic "July" garden. NOTE: Burpee is a registered trademark, and I am not saying anything bad about Burpee seeds. When I have bought them, they performed splendidly. (And no, they did not provide any funding for this book.)

As a person who controls weeds in crops, of course the most important difference is that there are no weeds in the January garden. The Burpee seed catalog only shows perfectly ripe, mature, unblemished fruit, vegetables or flowers. In virtually any garden there are going to be some weeds, and in many situations, they are the central issue that challenges gardeners. Weed seeds can remain dormant in the soil for many years, and when you finally start your garden, the weed seeds will then germinate and grow. The weeds always seem to grow better than the crops, the lawn, or whatever you're trying to grow. If your soil has no weed seeds (not very likely) then the wind, mulch, other seeds, wildlife, neighbors, or something is going to sooner or later introduce some weed seeds into your area. This is a difference between the "January" and the "July" garden.

Small gardens in urban settings may be considered to be "biological islands," meaning they are largely separated from the various living organisms often associated with that general plant or ecosystem. While some species range widely to find your plants, like honey bees which can forage from great distances for nectar and food supplies, other types of insects or other pests really can't travel that far. There are some crawling

types of insects and worms that, unless they're introduced on contaminated plant materials, compost or something like that, really are not going to "find" your garden. Now, if I'm trying to grow roses in my front yard, and there are dozens of other rose plants from a variety of other people in the same subdivision, then there is a pretty good chance that I will have some insects that like to eat roses or diseases that like to infect roses from these other inoculum sources (a repository of disease-causing agents which can hurt plants). That being said, I have roses in my front yard, and I'm pretty much the only person with roses in the entire subdivision, so I have some problems that all roses producers have with diseases, but I simply don't have many of the insects that other rose lovers and growers have to contend with, because those particular insects can't move the mile or two from where the nearest roses are growing to mine. Now that's not true for many species, and the classic example of the species that migrates the greatest distance is the monarch butterfly. I planted a few milkweed plants in my front yard and watched them grow into a pretty good size plant, about 3 feet tall. I didn't really think too much about it, until sometime in the summer when all of a sudden I noticed that all of the leaves were being removed. Upon closer inspection I found some really ugly looking caterpillars that were basically completely eating every single bit of leaf material from the plant. I mean this plant had no leaves at all left on it. It was nothing but stems and it looked very sad. Of course I took a picture of the caterpillar and learned that it was actually a monarch butterfly in its early form. I was excited about having this species in my yard, but I just want to share with you that this excitement was not in the January garden. I say this because the January garden has a certain set of outlooks and expectations, and even though my entire premise is to tell you that the January garden is not as good as the July garden, I share the monarch butterfly story to tell you that sometimes the unexpected surprises in the July garden actually can exceed the expectations, although often unrealistic, of the January garden. Suffice it to say that in the Burpee seed catalog, there are no insects, no insect damage, no blemished fruit, or any of the negatives associated with the insects that often can ravage gardens. By the way, there is a huge disparity of gardeners with respect to using insecticides. Some people let nature run its course, although in a truly natural setting you wouldn't have whatever garden species you just planted there anyway so, that doesn't make a lot of sense if you think about it. I mean, after all, if I wanted a natural system I would just do nothing and let it happen, and then you would have species change over time through the process of succession until you finally get to climax vegetation, where the ecosystem is in long-term balance and where no

inputs are necessary to maintain the climax vegetation. Oftentimes that's not a very aesthetically appealing situation. Anyway, some people who are gardeners believe that no synthetic pesticides should be used on their garden, and they will live with the huge losses from insects. At times it could be a 100% loss of the given vegetable. Others will believe in aggressive interventions using whatever chemical they can get that will kill those blankety-blank insects (genus and species withheld for information to maintain the safety of said insects). There is a continuum of chemical users between the "not on my garden" and "use anything you can get your hands on" ends of the spectrum. Actually, for the home gardeners there is a plethora of available choices oftentimes including effective pheromone traps where I'm just trapping the insect pests before they get into my garden. Side note: the most effective place to put the trap for a given pest is on the edge of your neighbor's property so that you're actually drawing the insects away from your garden. It's not wise to draw all the Japanese beetles right to where your roses are and then hope they go into the trap before they eat your roses. So, you can always tell the experienced gardener because he will offer the opportunity to put the traps on his neighbor's property because he is such a good neighbor. The effects of insects on vegetables is highly variable, and some species such as pumpkins are highly affected by insects that bore inside the stem. Other vegetables such as green beans, really don't have a lot of problems with insects under normal circumstances.

Plant diseases require three factors to be a problem in any situation: a susceptible host, a virulent pathogen, and a suitable environment. The gardener can try to select varieties that have some resistance to the various diseases, although they will have no idea what diseases they possibly could be in the year ahead. A virulent pathogen can be either a bacteria, a fungus, or a virus that can cause a given plant disease, and, depending on the biological isolation of the garden, this may be the best thing going for the gardener. If the source of the inoculum is not already in the garden, there is at least a possibility that even if I grow an heirloom vegetable that is highly susceptible to the disease, and I have the environment that is good for the disease to infect my plant, I still may not get the disease because there's no disease organism to cause it. Plant diseases will grow in a wide variety of environments, but in general terms, if it's really wet for a long period of time or if it's cool for a long period of time, you tend to have more plant diseases. Side note: a plant pathologist would never say it's this simple. They have all kinds of theories and axioms, but in general, when it is wet you have more problems, especially root diseases. Now there are fungicides that are readily available to help prevent some plant

diseases, and people can use them. The real challenge is that for many fungicides to be effective you have to spray them before you get the disease. They are a preventative treatment and not a curative treatment. So, I spray my roses about every seven days to try and stop some rose diseases from knocking all the leaves from my rose plants. I use a product that is formulated so that when it gets rained on, it doesn't get washed off. Still, when it rains frequently I spray more often, which is a real hassle. If you don't spray your roses, and you try to grow hybrid tea roses, you will not be successful. Species of vegetable garden plants have a wide range in their susceptibility to various plant diseases. My asparagus is virtually indestructible from plant diseases. Actually, it's pretty indestructible from about anything once it's established, which is one reason why I grow asparagus because I know the wildlife will not eat it, so they leave it for me (and it's very tasty.) Some common vegetables are prone to very serious diseases; like tomatoes, while other vegetables such as sweet corn have very few plant diseases. Either way the January garden view sees no plant diseases, blemished fruit, necrotic or spotted leaves in their garden.

Depending on where you live, the greatest single challenge to successfully grow plants is whether they receive the appropriate amount of water. Too much water can kill a plant by flooding, or it can cause the roots to degrade and to get infected with various root diseases. Too little water, which can often be the case, can result in the plant processes that need water not effectively occurring. Essentially, all of the reactions inside a plant to take the sun's light energy and turn it into chemical energy in the form of carbohydrates and then into many other chemicals, and then form the whole plant and to eventually make a flower, a fruit, a vegetable happen is in an aqueous or water-based system. So if there is a shortage of water, basically everything stops. Now, depending on the size of your garden, you simply water your garden, no problem. Where I live we get about 60 inches of rainfall every year, and most of it comes in the summer months, so it's pretty nice when you try to grow things here. This is not the case in much of the country, in fact water quantity is a major issue in many parts of the country. If you live in California, you understand that water quantity is a major issue. The people living in the cities along the west coast want lots of water, and they don't understand why the farmers need to flood all these fields in the great Central Valley to "waste" the water. We'll talk more about water in another chapter. Suffice it to say that the January garden has no drought, no floods, and the crops look perfect with respect to water balance.

When I first moved to my suburban home about 15 years ago, there was a backyard which had a really steep hill, but at the bottom, it was pretty level. I decided to put my garden in that lower area. I worked up an area that was 30' x 60', which is not a huge area but is pretty good size. I fenced that in with chicken wire with an electric fence on top, solar-powered I might add. The chicken wire fence was installed so that an animal could not dig underneath it. The total fence was approximately 3 feet high, which I thought would be more than adequate to keep any wildlife from entering my garden. I was wrong. Before that, I had a person with a large tiller working up the soil, every now and then the tiller, although of substantial mass, would jump up in the air! I asked the person what this meant, and he said, "Well, I keep hitting these big rocks." Now, where I'm from originally in Illinois, the soils are deep, fertile, dark and contain no rocks. I have come to learn in my travels around the US that depending upon where you are, there can be a lot of rocks in your soil. I have seen fields in the Northeast United States that appeared to have more rocks in them than soil, and I'm amazed the guys are trying to farm them! But, back to my garden. I tilled the ground up and got a lot of rocks out, added a good amount of inorganic fertilizer, planted some perennials such as Concord grapes and thornless blackberries, and proceeded to "garden" for several years. Although I probably picked a few vegetables from the patch, I would say it was pretty much an abysmal failure. In all my years I never harvested a single bunch of grapes, because some sort of powdery mildew disease, I think it was a mildew disease, would make all the grapes turn into some sort of black wood-like small pellet. This is not a technically correct term, okay, but it was pretty disappointing to have an unbelievably lush beautiful grape vine and get zero grapes from it. Yes, I tried to prune the grapes correctly to allow for more airflow in. Yes, I probably could spray fungicides, but the reality is the grape jelly that I can buy at the store is just about the same if not better than anything I can grow. My wife really doesn't like to make jelly because one summer she ended up with 3rd degree burns on her thumb and hand. She over-filled a jelly jar and got the hot jam on her hand. The thornless blackberries produced huge lovely plants, called brambles, with good-sized fruit on them. Unfortunately, they tasted "just okay" to my children and my wife, and I don't even like blackberries; I have strong, mixed memories of picking blackberries, which were not thornless, as a child on my home farm. A story for another time. Again, my wife did not wish to spend the effort to take these blackberries and make them into jam or jelly, by the way real gardeners know the difference between jam and jelly. The other factor that got to me was that the birds were flying in, the squirrels were

climbing in, the rabbits, deer, and Lord knows what else were jumping in and eating the fruits and vegetables in my July garden. As I got older, it was also more and more difficult to simply walk up and down the hill. I did mention that I have a steep hill in the backyard right? Add all these factors together and I ended up ripping up the fence and sowing tall fescue seed; and I now simply mow it. I have only a small asparagus bed now, up on the top of the hill near my house, since apparently nothing will eat it except humans. The asparagus I now pick is far superior to the green hard stems of wood, hardwood at that I might add, that they call asparagus from the grocery stores. The reality of gardening in urban settings is that wildlife can be a major challenge. To be honest, there are farmers that also struggle mightily with deer that eat their soybeans, and ranchers have struggled with wildlife eating their stock for generations, so in that way there are similarities with the urban and rural farmers. Now, the stores sell mechanical control measures, such as motion activated water blasters. These may work. The stores also sell fake predators, such as hawks or coyotes, etc… I realize most wildlife are not that smart, but after a few weeks of a thing not moving, I think the critters might figure it out that the thing painted like a predator is not really a threat… The January garden does not mention or see any wildlife damage.

Year-round schools have changed Americans' lives in many ways, depending on the level of adoption of this change in your education system. Historically, schools were closed in the summer months, ostensibly to allow the children to work on the farm, tending the fields, and providing free labor to their parents. I will not even begin to comment on the changes in parenting and how the lack of agricultural involvement has changed the work ethic of our society today. That would be a topic for another book. But with respect to gardening, years ago you would basically plant your garden about the time school got out, and most of the harvesting would be done prior to school beginning again in the fall. Such is not the case anymore. Additionally, vacations used to happen primarily in the summer months when the "kids were out of school." This would mean that the garden would be untended for a period of time ranging from a week to two weeks or so. This would mean that any kind of maintenance, weeding, watering or harvesting, would not be happening in the absence of the gardener. Of course, the January garden does not show any of these absences or any of the okra that wasn't exactly the right size and in fact is about 2 feet long and could be used in construction of housing because it's so tough. The January garden does not show the tomatoes that have rotted on the vine because nobody was there to pick them, and now they are a slimy, rotten mess. When the gardener returns, it

will take a day to clean up all that mess and throw a bunch of stuff away, no real problem. Probably, the compost bin is pretty close to the garden anyway. I know this can be true, since when I returned home from a summer holiday, this is what I had to do each time.

To get a perfectly-formed, aesthetically-pleasing mature fruit or vegetable requires a dance of many inter-playing factors. One aspect that is never really focused upon is mineral nutrition of plants. Plants extract nutrients from the soil. They store these largely in the fruits and vegetables because that is where the seeds are, and that is where the plant is trying to get the best chance of survival so they put the most nutrients in the fruit or vegetable. Then, we humans eat that fruit or vegetable because it contains the same nutrients we need to live.

Fertilizers are a big part of successful gardening, just as they are an essential part of farming. We will talk about fertilizers and especially nitrogen, phosphorus, and potassium in another chapter. However, and you are probably getting tired of hearing this, so I believe this is the last time I'll say this phrase, the January garden does not have any nutritional deficiencies in the plants, and the plants/fruit are not withered because they do not have enough of a certain nutrient.

The January garden always produces perfect fruit, vegetables, flowers, lawn, tree, or whatever you are trying to grow, that is the way it is. There is nothing wrong with that, and this annual renewal of optimism as we come out of the winter season is an overwhelmingly positive attribute of the human species. Even though the trees have lost all their leaves, and the grass doesn't look so good in this cold, and it is raining, snowing or whatever, we can look at that Burpee seed catalog, and we can dream, and we can enjoy that time and the harvest of the days to come. I am not surprised that the Bible begins with the story about a garden and how a person(s) tended the garden. I guess as humans we kind of messed up and perhaps were not as good a gardener as we could've been.

The idea I have shared with you about a January garden could also be extrapolated to many metaphors in life. A couple of them which I'll just discuss very briefly include:

the first day of college for you or your child,

the day you got married,

your first day on your dream job,