

GARDENING
WITH BRAINS

HENRY T. FINCK



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GARDENING
WITH BRAINS

by

Henry T. Finck





*From left to right—Luther Burbank;
John Burroughs, Edith Simonds,
and Henry T. Finck.*

GARDENING WITH BRAINS
FIFTY YEARS' EXPERIENCES OF
A HORTICULTURAL EPICURE

BY
HENRY T. FINCK
Author of
"FOOD AND FLAVOR"



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GARDENING WITH BRAINS

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CONTENTS

	Page
PREFACE: BRAINS AND THE GARDEN MANIA	xv
CHAPTER I: A MOUNTAIN GARDEN IN MAINE	3
What Seeds to Buy	6
CHAPTER II: RAPID TRANSIT TO THE TABLE	9
How Corn Loses Its Sweetness	11
Tomatoes and Potatoes	13
CHAPTER III: WHAT VEGETABLES WE SHOULD GROW OURSELVES, AND WHY	15
Baby Cabbages and Senator Peas	17
Better Raw Than Cooked	18
The Spinach Problem Solved at Last	21
Increasing the Yield	24
Weeds and Hoes	25
Fragrant Luscious Melons	26
CHAPTER IV: FAVORITE GARDEN FLOWERS	30
Nasturtiums No Longer "Yellow Dogs"	31
Let Fragrance Decide	36
Why Bulbs and Perennials?	38
Peonies and Perennial Phlox	41
Lilies, Irises, and Gladioli	45
The Most Alluring of the Annuals	49

CHAPTER V: HOW TO START A GARDEN	55
CHAPTER VI: BRAINS, BRAINS, AND MORE BRAINS	63
Technic of Gardening	64
Be a Gambler	66
Humus, Leaf Mold, and Fertilizers	67
Green Manuring	70
Getting Strength from Greens	72
CHAPTER VII: WHEN VEGETABLES GET PNEUMONIA	74
Jack Frost Is Innocent	75
Protecting Fog	76
The Devilish Witch Grass	77
CHAPTER VIII: MALE <i>versus</i> FEMALE ASPARAGUS PLANTS	80
Wasting Energy on Berries	82
Makes Us Horribly Selfish	85
CHAPTER IX: ON THE WARPATH IN THE GARDEN	90
Rose Bugs and Grape Blossoms	91
Hosts of Garden Huns	93
Grasshoppers, Woodchucks, Crows, and Cats	94
CHAPTER X: LADYBIRDS, TOADS, AND CHICKENS	98
Toads, Yes—Snakes, No	99
Chickens and the Garden	101
A Prohibition Rooster	104

CHAPTER XI: MORALS OF ELM TREES AND CUTWORMS	106
Tragedies in the Garden	108
Malicious Worms	109
Study the Anatomy of Roots	112
 CHAPTER XII: DAILY MIRACLES IN THE GARDEN	 115
The Intelligence of Plants	116
How Plants Utilize Dew	119
The Most Marvelous Thing in the World .	120
 CHAPTER XIII: HOW TO BE HAPPY, RAIN OR SHINE	 124
The Art of Transplanting	125
Effective Crop Insurance	127
Make Intensive Gardening Compulsory! .	129
 CHAPTER XIV: A NEW TIME-TABLE FOR VEGETABLES	 132
Stop the Loafing	134
Unstringing the Beans	135
Three Weeks' Potatoes	137
 CHAPTER XV: AN OPIUM DREAM OF NEW POPPIES	 140
Oriental, Darwin, and Silver Lining . . .	141
Burbank's Art Shirleys	145
How to Raise Fairy Poppies	147

CHAPTER XVI: TWO THOUSAND ACRES OF SWEET PEAS	150
A Thousand New Varieties	152
The Australian Yarrowa	154
Cultural Directions	156
CHAPTER XVII: MODERN PANSIES AND THEIR CULTURE	158
Recent Improvements	159
Cats' Faces and Other Faces	160
Human Traits of Pansies	162
CHAPTER XVIII: GARDENERS WHO PAINT THE LILY	165
Wild-flower Gardens	166
The Shasta Daisy Was a Weed	167
Petunias and Dahlias	170
CHAPTER XIX: THE FRAGRANT SOUL OF FLOWERS	172
Fragrance Intoxicates, Like Music	174
Educating the Sense of Smell	176
Natural Perfumes Best	178
A Symphony of Lily Perfumes	179
CHAPTER XX: ARE PIGS GENUINE EPI- CURES?	182
Clover-blossom Pork	183
A Maligned Philosopher	185
If All Were Epicures	187

CHAPTER XXI: EDUCATED STRAWBER- RIES AND BURBANK PLUMS . . .	189
John Burroughs Delighted	191
Burbank's New Plum Flavors	194
 CHAPTER XXII: COMMERCIAL VALUE OF BURBANK'S NEW CREATIONS . . .	 197
A Bird's-eye View	200
Saving Space, Time, and Money	202
Bonfires and Moral Character	204
A Gardener of a New Kind	207
Cherries and Berries	212
Money Value of Improved Flowers . . .	217
 CHAPTER XXIII: JAPANESE BURBANKS AND MORNING-GLORIES	 219
 CHAPTER XXIV: MUST WE RAISE OUR OWN FRUITS, TOO?	 222
Time May Swing Back	223
Peaches of Other Days	225
The Best Apples	229
 CHAPTER XXV: DO APPLES KEEP THE DOCTOR AWAY?	 232
The Fruit Cure	233
Another Burbank Triumph	234

CHAPTER XXVI: WHY NOT GROW PA- PAWS, AMERICA'S MOST DELICIOUS FRUIT?	236
Strange Habits of a Queer Plant	238
Thinking It Over Six Months	239
The Tropical Papaya	242
CHAPTER XXVII: THE RETIRED RICH NEED NOT DIE	244
Have a Little Garden in Your Home	245
A Sporting Proposition	247
Healthy Plants Radiate Happiness	248
CHAPTER XXVIII: THE JOYS OF CRE- ATIVE GARDENING	251
Begging for Immediate Improvement	253
How We Improve on Nature	255
The Enemies of Great Men	257
The Truth About Spineless Cactus	260
INDEX	267

WHY?

WHY another book on gardening? You might as well ask, "Why write a historic novel when there are so many histories giving all the facts?" There are plenty of garden books giving all the facts—for *reference*. But this book is for consecutive *reading*. The important facts are here, too, but sugar-coated with wise and witty remarks and spiced with anecdotes and other things that suggest the perfumed atmosphere of the garden and appeal to the garden maniac.

The world's most famous gardener, Luther Burbank, wrote to the author of this book that its chapters are, in his opinion, "the best that have so far been written on garden subjects. You get at the facts in such a pleasing, human way that they are irresistible. Your articles suggest to me the difference between living, moving, growing plant life and the dead, dry, flat specimens which one sees in herbariums."

PREFACE. BRAINS AND THE GARDEN MANIA

"I AM densely ignorant—only just barely know dahlias from mignonettes," wrote Henry James in May, 1898. But a few months later he declared, "The garden mania begins to stir in my veins."

The garden mania! When that gets its grip on you, then good-bye to golf and fishing and hunting and most other summer sports. You don't believe it? Just try and see. But you must use your brains as well as your brawn.

Everybody has heard of the great English artist who, when asked what he mixed his paints with, replied, "I mix them with brains, sir."

There is an old story about a poor widow who went to her pastor and complained that, although she prayed every day for a good crop, her garden refused to yield it. After inspecting her soil the pastor remarked: "My dear madam, prayer is the greatest thing in the world, but you must also use the brains the good Lord gave you. Your garden needs fertilizer."

Cantaloupes, writes Robert Welles Ritchie in the *Country Gentleman*, "are not a cheap crop—not a hit-and-miss crop. Brains, infinite patience, money, and then some more brains go into the rearing of it."

The same is true of most other crops, useful or ornamental. If carried on with intelligence, gardening is a succession of delicious thrills.

Some drudgery there is, of course, and hard work aplenty; but remember what "The English Plowman" says—"It is not so tiresome to plow well, sir; the mind is interested." I cannot imagine anyone being ever bored in a garden which is well cultivated.

That every man or woman who reads this book has brains—inherited or acquired—is sure. There is one thing, however, we cannot inherit—experience; that must be acquired, which is lucky for us fellows who write books. The process of acquiring experience can be greatly accelerated by reading about the adventures, successes, and failures of others.

My own experiences, as recorded in this entirely informal and chatty volume, cover more than fifty years. They began in Oregon, when I was a boy (James Vick of Rochester, New York, was at that time, I believe, the only mail-order seedsman in the country—and now look at the multitude of them and their enormous business!), and will, I hope, continue many more summers; for I consider life worth living. Nothing, certainly, makes it more so than the daily garden thrills for five months every year, and the healthful exhilaration that gardening brings.

"How much better you are looking!" I said to a friend last May.

"Yes," he replied. "I began my gardening three weeks ago."

Of course I too have benefited by the experiences and advice of other gardeners, amateur as well as professional, having for about three decades read and reviewed all the new garden books for the New York *Evening Post*. It was in the *Evening Post*—with which I have had the honor of being connected forty years as musical and epicurean editor—that fifteen of the chapters in this book about my garden in Maine first appeared.

It was Mr. Simeon Strunsky, leading editorial writer on that paper, who suggested this exploiting of my horticultural experiences. To him, and to the president of the *Evening Post* company, Mr. Edwin F. Gay, who has kindly allowed their reproduction in book form, I have dedicated this volume. I also wish to thank *Good Housekeeping* and the editor of *House and Garden*, Mr. Richardson Wright, for permission to reprint articles contained in this book. Chapters I, II, III, IV, XXII, and XXVIII have not heretofore appeared in print. I may be permitted to add that while these chapters appeared in the press I received many letters from all over the country expressing the hope that they would be conveniently reproduced between the covers of a book.

Am I vain in consequence? An uncle of mine, Charles Black, used to say, "Whoso bloweth not his own horn the same shall not be blown."

Have I not reason to be stuck up when the foremost gardener in the whole world, Luther Burbank, wrote me, after reading some of the chapters, that, quite apart from what I have written about his work, which he pronounces "very accurate," the chapters in this book are, in his opinion, "the best that have so far been written on garden subjects."

Inasmuch as I wrote this book for men and women who have brains and know how to use them, I have devoted a considerable number of pages to the gardening of the future as exemplified by the activity of Mr. Burbank, Henry Eckford, and other plant breeders who are beautifying our flowers and making our garden vegetables more palatable. I have done this, partly, in the hope that those of my readers who have the necessary means and leisure will help to promote what might be called these plant eugenics.

Let no one think for a moment that there is not a great deal more to do. In view of the simply amazing amelioration of most garden plants since the day when our parents were young, I have expressed the opinion (in the chapter on "Favorite Garden Flowers") that it seems almost impossible still further to improve them, except in fragrance and flavor, but Mr. Burbank takes a much more sanguine view. In a letter to me dated September 8, 1921, he wrote:

The flower improvers have still a whole universe in improving them—not only as to fragrance, but in ten thousand other ways not imagined by any ordinary florist. Twenty years ago the carnation was thought to be as nearly perfect as it could be made. On a visit to Long Island I told Mr. Charles W. Ward a simple thing which I had discovered regarding the carnation, and he told me, before he died here in California, many times that he made considerably over half a million dollars out of the carnation from my plan, as he used to say, “before the other fellows got on to it.”

Fragrance, of course, is lacking in many flowers, though I have added it to the calla, verbena, and dahlia, and intensified it in practically all the flowers with which I have worked. Besides fragrance we must have flowers of a more uniform growth and color, new combinations of shades, hardier ones, those which bloom longer in the season, those which remain fresh longer after cutting or on the plant, and so many other things that are totally inconceivable to the ordinary person that it is not necessary to mention them.

There are two kinds of books on gardening. The more numerous kind is for reference rather than for reading, giving useful hints according to a regular scheme. The other kind is exemplified by Charles Dudley Warner's *My Summer in a Garden*, which, while entertaining to all who love gardens, gives very little useful information. I have tried to combine the two kinds—to give a great deal of horticultural up-to-the-minute information, but in a readable fashion. It is for the readers to decide whether I have succeeded. I hope the book will fall

into the hands of many who know little about gardening as a sport and a thrill factory; for one of my main objects is to mobilize new recruits and multiply the number of garden maniacs.

GARDENING
WITH BRAINS

2



CHAPTER I. A MOUNTAIN GARDEN IN MAINE

MAINE is the only state in the Union where sugar cane cannot be raised. It grows there only a few feet high and the sap isn't sweet. If all our cane sugar had to be raised in Maine it would cost about a thousand dollars a pound.

Maine corn, on the other hand, is the sweetest corn raised in this country or anywhere. Most of the canned corn in the market pretends to come from that state, or is labeled "Maine Style." That tells the whole story.

A strange paradox—for corn is a hot-climate plant quite as much as is sugar cane. The two plants are cousins, and at a distance look almost alike.

How do I explain this paradox? I don't try to explain it; I simply state it as a curious fact. I tried sugar cane—once, and never again. But corn—sweet corn—has the place of honor in my vegetable garden, which is situated in Oxford County, near the picturesquely located village of Bethel.

Mount Washington and the rest of the Presidential Range of the White Mountains are in full sight, less than twenty miles to the southwest. At the time we start our garden, early in May, Washington and its neighbors, Jefferson and Madison in particular, are still clad occasion-

ally in robes of snow reaching down almost to their feet, and chill breezes come to our garden from them.

On the other side are the mountains of Maine, the highest of which, Speckle (silly name!)—which has recently been proved to be a little higher than the better-known Katahdin—is even nearer to us than Mount Washington; not so near, fortunately, as to inflict on us the July and August frosts which sometimes ruin the crops of the farmers who dwell near its foot. But we have had frosts the third week in June and before the end of August; and in twenty summers up here I have never known the first autumn frost to hold off later than September 21st.

My object in giving these details is to justify the title of my book, *Gardening With Brains*. By using such brains as have been placed at my disposal I have been able to succeed wonderfully with my flower and vegetable beds, without a single failure in twenty summers, despite discouraging frosts—and droughts; for this region is not usually blessed with sufficient spring rains, and there are awfully hot days in summer. In 1920—the summer of perpetual rain south of Maine—we had seven weeks of drought; and one week, when New-Yorkers were quite comfortable, we had 98 to 100 in the shade, day after day.

The days are longer here, too; but the extra

hours of sunlight, I need not say, accelerate the growth of garden plants and give the corn and peas and other vegetables such succulence and richness of flavor as you will not easily find elsewhere.

If my way of gardening—original in some details and unconventional on the whole—has given such satisfaction on a knoll exposed to fierce mountain blasts and the other disadvantages referred to, it surely cannot fail in gardens more favorably located.

But, no matter how well situated and climatically favored your garden may be, you will have to have your wits about you, looking ahead all the time.

With all my alleged brains, and after a gardening experience of over half a century, I made a stupid blunder in the summer of 1920, which taught me a lesson for the next half century. (I mean almost literally what I say, for my gardening has done such wonders for my health that at sixty-seven I feel like thirty-seven in every way, and I fully expect to reach the age of one hundred.)

In that summer there was a nation-wide express strike, and freight moved not much faster than a glacier. By delaying to order my seed potatoes till I thought it would be safe to ship them north, I had to pay nine dollars a bushel for what I could get, but some of the fancy extra varieties I wanted to plant could

not be obtained even at that price. Nor could I get all the fertilizer I wanted in time.

WHAT SEEDS TO BUY

The brainy thing to do is to order in January everything you may need in your garden the next April, May, or June. This includes seeds of all kinds. The seedsmen usually send out their catalogues in January. As soon as you get yours—and it is wise to have several, from reputable firms like Burbank, Burpee, Vaughan, Dreer, Vick, Thorburn, Henderson, Salzer, etc., which are all free—make out lists of what you want and mail them. Most people wait till spring, with the result that seedsmen are swamped with orders and find it impossible to supply all their customers at the “psychological moment,” which means the difference between a whole season’s success or failure. Think the matter over, act promptly, and you won’t find yourself wringing your hands some day in April or May and wishing you had had your seeds in the ground “in time for this glorious rain.” A drought may follow that rain and prevent you from getting your seeds started for several weeks. I see that sort of thing happen nearly every year in neighboring gardens.

Use your wits, too, in the matter of government seeds. Your Congressman will send you, of his own accord or by request, packets of

vegetable and flower seeds. They are free, but you do not know who raised them or whether they are not too old to germinate; and you surely do not wish to bestow your time and labor on a garden for two or three months and then find to your disgust that your flowers are commonplace and your vegetables tough and insipid.

Government seeds *may* be good, and doubtless they are—sometimes; but you lose confidence in them when you find out something about this political business of free seed distribution. Here is an enlightening paragraph from the *New York Evening Post*:

Do our farmers' associations, "resolving" about railroad rates, know that when the question of the annual appropriation for the distribution of seeds came up this costly year (1920) one of the thirty-odd Congressmen wanted once more to shift this job to the Agricultural Department, where it logically belongs, but a bipartisan majority voted \$359,980 (50 per cent more than last year) to keep this graft in the hands of the grafters? This was done secretly in committee of the whole, because no man dared to have his vote recorded.

You must have miraculous faith in human nature if you think that seeds bought and distributed under such political conditions are worth planting. To be sure, they may be good, but, as I have said, you haven't the faintest idea who grew them or how old they are (and some seeds do not germinate after the second

year). In midsummer and autumn, when you compare your free-seed plants with those of a neighbor who bought his of a reputable seedsman, you will be likely to make sorrowful comparisons.

One September, after I had been eating Burbank & Chalk's Early Jewel tomatoes for several weeks, a farmer's wife showed me a row of tomato plants (started very early in a cold frame) which had green, half-grown fruit on their vines, none of which could possibly ripen before frost. She had received them from a Congressman, who should have known that that variety could not mature in Maine. A dime spent on the right seeds would have given her bushels of ripe tomatoes.

CHAPTER II. RAPID TRANSIT TO THE TABLE

TIME was when people used to debate the favorite topic whether the city or the country offered the greater advantages and pleasures. Doubtless such discussions are still in vogue, but at present the ambition of those most interested is to *combine* the advantages, in what are called garden cities—the cities of the future.

In these garden cities, of which England and Germany have so far provided the best examples, laborers with modest incomes, no less than the well-to-do, can dwell in clean, roomy houses, breathe fresh air, raise their own flowers and vegetables, and live like epicures.

To be able to dwell in such a civic garden altogether is indeed a privilege. For those who cannot do so there are various expedients, the most tempting of which is the allotment gardening which had become so popular in some German cities, notably Dresden, before the war. There anybody could for a small sum rent a lot, from twenty to fifty feet square, on the edge of the town, where those whose occupation kept them indoors could go with their families in the evenings and on holidays. Each garden was surrounded by a vine-covered fence, and there was a padlocked gate to which the owner alone had a key. Some of the larger lots contained

fruit trees, while in the smallest there was room for peas and beans, or potatoes, carrots, strawberries, and other table luxuries and necessities. As Consul Tredwell justly remarked, "this substitution of fresh vegetables for the cheaper varieties of store food is of primary importance to the health of a congested community."

If city folk fully realized the gain in health and pleasure that would result from eating "home-made" vegetables in place of the grocer's usually wilted wares, the building of garden cities would be accelerated with a rush, and vegetarianism would suddenly become so popular that meat prices would tumble down all in a heap, so that every consumer would be happy.

Under present conditions the only opportunity the average citizen has to find out what a treat it is to eat vegetables fresh from the garden is in vacation time, at a farmhouse. Comparatively few, however, board with farmers, and many farmers, moreover, do not know how to raise the best vegetables, nor their wives how to cook them in the most savory ways. As for the rural inns and hotels, it is surprising how many of them get their vegetables in cans from the cities; and while canned goods of all kinds have undoubtedly improved greatly within the last few years, and are now, perhaps, as desirable as most of those sold as "fresh" in the cities, they are no more to be compared with

those just out of the garden than cold-storage fish with trout just out of the water.

The best trout I ever ate were three that I caught one summer in Yellowstone Park, and then promptly killed and cooked without taking them off the hook. One I boiled, another was steamed, the third baked on a hot stone. The boiling water, the steam, and the hot stone were those of a geyser on the edge of a cool stream. If you think this is a "fish story" let me recall the fact that General Grant performed a similar feat on a geyser cone in Yellowstone Park.

HOW CORN LOSES ITS SWEETNESS

A cooking cone like that would be a fine thing to have in your garden, for really you cannot get your own peas and pod beans, your young carrots and beets, and above all your corncobs, into the pot too soon. It is only from our own garden, says a writer in the *Country Gentleman*, that sweet corn can be depended on to be at its best, as it loses its sugary content soon after pulling. "It has been proved that at the end of twenty-four hours following pulling, 30 per cent of the sugar will have disappeared, and in the next twenty-four hours about 25 per cent. This leaves precious little sweetness in our sweet corn if it has been kept for two days." Yet that is the condition in which most of the corn is eaten in our cities!

"The water should be boiling ere the corn is pulled," is a good old maxim which we follow scrupulously. We have also made our jarred Golden Bantam (as improved by Burbank) a feast for epicures by canning it when it is as young and milky as when it is eaten directly from the cob. We score the rows of kernels with a sharp knife and scrape out the juice and tender meat, leaving all the husks on the ear. You ought to see the expression on the face of our visitors when for the first time they taste it. Corn like that ought to bring five times as much as the dry, flavorless, husky stuff usually sold in cans.

We city folk consider ourselves wondrous wise in having made arrangements that enable us to have "fresh" vegetables, berries, and fruits all the year round. But after a long transit from the South they are no longer fresh. Far better is it to wait till they are "in season" in our own latitude.

The first strawberries in our markets are small, sour, flavorless; yet thousands gobble them up eagerly, thus taking off the edge of the season's appetite; and when, a little later, the luscious, sun-ripened, fragrant berries of near-by gardens arrive, these same persons miss the virgin joy of eating the superior product.

Epicures, whose chief concern is superior flavor (not only because they enjoy it, but because they know that it stimulates their

digestive glands and is good for their health in general), wait till they are sure of it, knowing that long-distance berries, fruits, and vegetables are about as enjoyable as telephoned kisses.

The disadvantages of long-distance marketing are being gradually diminished by superior shipping, precooling, and chilling arrangements; but nothing will ever take the place of vegetables and berries gathered from your own garden an hour before they are eaten.

TOMATOES AND POTATOES

“I would go to the country to live, if for nothing else, to find out what corn, peas, and beans can be at their best,” exclaims E. P. Powell. He might have added tomatoes. It is true that these do not spoil so rapidly, yet their freshness is, from the epicurean point of view, of far greater importance than is commonly supposed. Unfortunately they can be picked when hard and green, and allowed to redden gradually. Most of those sold in the cities, even when grown in the neighborhood, are now of that kind. Though they redden, they do not really ripen, remaining tough till they spoil, at no time fit for anything but a stew. To enjoy them in a salad, or eaten out of the hand, we must have them fresh from the garden. The difference is astounding. Only a fresh tomato has the peculiar flavor suggested by the fragrance of the plant itself when you

gently crush a leaf. Such a tomato is as superior to the city grocer's as a fragrant Havana is to a five-cent cigar.

Fortunately the most useful of all vegetables, the potato, does not need to be transferred at once from the garden to the kitchen. Yet it deteriorates sooner than is commonly supposed. Once in the Yosemite Valley I ate one which I was assured was a year old, yet it was still mealy and of a fine flavor; but that was an exception. Most potatoes cease to be at their best when five or six months old. In July, August, September, October, November, a new baked potato, with salt and fresh butter, makes a delicious meal in itself—a specific for persons who wish to gain weight; but after Christmas I have no use for the year's crop. The tubers gradually lose flavor and become soggy and indigestible; and as sprouting time approaches they become injurious to health also, because of the development in them of a poisonous principle common to plants of the same family.

We welcome the Bermudas which come into the market ere winter is over, but the early varieties are usually shipped before they are mealy or have much flavor. The plain truth is that there are several months every year during which we ought to give up potatoes altogether, using in their place macaroni, boiled chestnuts, rice, fried hominy, or divers other dishes that appeal to vegetarians or else go well with meat.

CHAPTER III. WHAT VEGETABLES WE SHOULD GROW OURSELVES, AND WHY

WHEN I planned my first trip to Switzerland the first thing I did was, of course, to buy a Baedeker. Of all guide books ever printed, that was undoubtedly the best. It covered every mountain, village, road, and cow path; gave the prices of all the hotels and wayside inns, with an estimate of their degree of excellence; and the hundreds of glorious viewpoints were one and all described so eloquently and yet discriminatingly that I was completely at a loss what to do. It was impossible to see everything in a few short summer months. What was I to prefer? Fortunately, some friends who had been everywhere in the Alps made out a route for me which the subsequent experience of ten summers in Switzerland showed to have been just right.

Readers of this book who are planning their first garden—and my principal object is to persuade as many as possible to grow their own vegetables and flowers—will do well to seek similar advice from friends or neighbors who have had gardening experience and know what can be grown best in your county. The catalogues of the great seed growers are as elaborate and as puzzling as a Baedeker. When you first look them over you mark something

on nearly every page that you surely *must* have in your virgin garden. But beware! The mistake of mistakes is to plant more than you can take care of, to bite off more than you can chew. Remember that plants have to be watered and cultivated frequently, and seed pods clipped every day or two, to insure large, healthy blossoms and prolong the bloom. A pansy or poppy bed five feet long and well groomed will give you infinitely more pleasure than a neglected bed five times as big.

As regards vegetables, unless you have lots of time and plenty of help, it is advisable to grow only those you cannot buy reasonably and in prime condition. There is no special reason for raising your own potatoes, for example, or beans for the winter, or eggplants, or cabbages, or turnips, or oyster plants, or pumpkins. Every farmer grows most of these; you can buy them in any city or country store, and the grocers cannot spoil them, as they do the peas and beans and lettuces and corn and carrots and beets and spinach and asparagus, by exposing them for hours and even days to the desiccating sun. It is these succulent varieties, including also okra, summer squashes, cucumbers, and tomatoes, that you should specialize in.

Cucumbers, by the way, while taboo to many, become as digestible as squashes if cooked. They are delicious creamed. Celery, oyster plants, parsnips, eggplants, onions, you can buy

at the grocer's; but radishes, if you want them crisp and just the right age, should be raised in your own garden—a new planting every two or three weeks. They come up in a few days and are the easiest to grow of all vegetables. Nothing could be more piquant than the little “red buttons” and scarlet globes and French break-fast radishes. The only trouble is they get pithy and stale so soon. Far less troublesome in this way is the long white Icicle; it is as crisp and tender and well flavored as the reds, and keeps in good condition much longer. Still, it is at its best when young and slender. Many people think they cannot digest radishes, but they are usually mistaken. When thoroughly chewed I have never yet known them to disagree with anybody. They are also not bad creamed, a fact which few know.

BABY CABBAGES AND SENATOR PEAS

When these chapters were appearing in periodicals I received many letters from all parts of the world patting me on the back or offering suggestions. One of the most interesting of these came from a naval architect and engineer, J. Beavor Webb, who related his experience with cabbages near Southampton in England. He raised them, from seed to table, in six to seven weeks. He followed the usual course in starting the seed in a frame and transplanting, but what his plants specially benefited by was

liquid manure from a near-by horse stable, which he diluted and used on them continually. The variety of cabbage used was Sutton's Early, or Jersey Wakefield. He did not let his plants reach maturity, but cut them young. "These cabbages," he adds, "were entirely different in flavor from those grown in the ordinary manner. Even in Smithtown, Long Island, where I subsequently raised them, they used to talk of my baby cabbages, and said they were the best they ever ate."

Baby cabbages, no doubt, would agree with many who cannot eat of the full-grown heads. The chief trouble is the method of cooking. Cabbage should be steamed instead of boiled. Boiled cabbage is very indigestible, sometimes deadly. Steaming is also the best way to cook potatoes, peas, carrots, etc.—for three reasons: (1) They are more digestible than when boiled; (2) Their flavor is richer; and (3) The mineral salts, so important a factor in food, are saved. It is too bad that the habit of serving cabbage raw, as cold slaw, has gone out, for cabbage is far more digestible raw than cooked. Better in flavor, too. So are peas and carrots and corn and turnips and tomatoes and—as I only just discovered accidentally—asparagus tips.

BETTER RAW THAN COOKED

The eating of these vegetables raw should be encouraged, for cooking often destroys the "vitamines" which abound in them and which

are so essential to our growth and maintenance of health. Here, indeed, we find one of the strongest arguments for having our own garden. I wish you could see the eagerness with which my neighbor's children pluck and eat raw young carrots. Paul told me he once ate fourteen, and all three of them are as healthy as if they ate nothing but "vitamines," or mineral salts.

I am often amused at the amazement with which people stare at me when I tell them what vegetables I eat raw—they couldn't look more surprised if I were a giraffe with two necks, or something of that sort. Simply because I add corn and peas and carrots and turnips and asparagus to the things *they* eat raw, including radishes, lettuce, melons, tomatoes, cabbage, celery, onions, cucumbers, and forty kinds of fruits and berries. My little nephew, after eating one ear of corn uncooked, always insisted on having his cobs raw, because he found them sweeter than the boiled or roasted ears; and when I taught him to eat peas right from the vine he exclaimed, enthusiastically, "Uncle, I don't want mine cooked any more!"

Most people prefer beef to veal; but in the vegetable garden we want the veal, the young plants, every time. Baby pod beans are a million times better than the huge, dry, full-grown pods which alone our greengrocers offer for sale. Hence you should raise your own pod beans. Plant only the stringless kind. Pole

beans yield longest. If any of your beans get over three inches long leave them to grow to full size and eat them without the pods, as shell beans.

Baby peas are more expensive than the full-grown because it takes so many more of them to make a quart, but how much more tender and flavory they are! Few people seem to have ever had all the young peas they wanted to eat. When I wrote to a wealthy friend of mine regarding a dinner my family had just eaten, he wrote back: "It makes me gasp to think of your eating three quarts of *shelled* peas. Didn't you suffer from *shell shock*?" I haven't spoken to him since. There's a limit.

When Luther Burbank was asked for a new kind of peas, small as the Parisian *petits pois* and all ripening at once so they could be harvested by machinery (for canning), he provided them in a few years. For these peas I have, of course, no use. In a family garden we want peas which will not all ripen at once, so we can have half a dozen pickings from the same row. The Senators, unless killed by drought, will keep on blooming and yielding pods for weeks.

Another way to prolong the season is to plant different kinds. Some ripen in two months; others require three. Late peas should be planted early, too—as early as the ground can be worked. Emphasis is placed by seedsmen on the fact that the wrinkled peas—which are sweeter than the smooth kinds—are apt to rot

if put in while the soil is still cold and wet; but in light, sandy soil the danger is not great. In any soil, take the risk.

Peas are cranky; they can stand hot weather only if their roots can go way down where the soil is cool and damp. If you can thoroughly soak these roots twice a week in dry weather, you need not worry about the crop. In regions where August is apt to be cooler and rainier than June and July, a July sowing of early varieties often gives gratifying results.

THE SPINACH PROBLEM SOLVED AT LAST

Too many Americans say they do not like carrots and beets. They don't know what they are talking about; for when the right kinds, baby size, are placed before them they say, "Yum-yum!" and ask for more. Try the Parisian forcing carrots. They are always "small, but, oh my!" As for beets, look not upon them with favor when they are red, but plant the light-pink and whitish Bassano variety, which is not only sweeter and tenderer, but remains edible longer than the reds. Sweeter still are the sugar beets. There is a general impression that these are good only for making sugar or feeding cattle, and most of the seedsmen, who ought to know better, do not offer them at all among the vegetables intended for the table. Try the white Wanzleben sort and you will find it, when young, as tender as the Bassano,

and even sweeter. The first time we had them my seven-year-old nephew exclaimed, joyously, "Uncle, let's have only this kind next summer."

Of all vegetables, carrots and spinach are the most valuable because of their extraordinary richness in mineral salts. Carrots are easy to raise if you remember that they are slow to germinate. In dry weather, therefore, cover the seed beds till the plants are up.

Spinach has a most aggravating habit of going to seed as soon as the weather gets hot. Many a time have I been fooled by optimistic seedsmen who dreamed they had discovered a summer-proof variety, and finally I swore off on home-made spinach plants. But in 1920, being a good deal of an optimist myself, I tried a novelty featured by Vaughan, called "Antvorskov." We found it equal in flavor to any spinach we had ever eaten and—a garden miracle!—it was not only "slower to run to seed than any other sort," but some of the plants, which I left on purpose, did not shoot up after being in the ground four months!

The spinach problem is solved! If you think you don't care, because you do not like spinach, anyway, try it the French way, chopped fine, mixed with a big lump of fresh butter, and a poached egg dropped on it.

Some other vegetables that belong in every garden—notably corn and lettuce—are referred to in other chapters of this book (see Index), with

mention of the best varieties to grow in the home garden. Of most vegetables the large seed catalogues offer a bewildering variety. I like Burpee's way of marking with a ⊙ the sorts he considers best; also, Vaughan's way of charging an extra price for his choicest seeds, marked "special."

As I am not writing a horticultural dictionary or a book of reference, I cannot dwell on all the vegetables which epicures may desire in their home gardens and their culture. To all who want a helpful guide I cannot too highly recommend a volume published by the Macmillan Co., *The Book of Vegetables and Garden Herbs*, by Allen French. Get it, by all means; you will consult it daily during the sowing season; I do so myself, after half a century's gardening experience, to refresh my memory. The plan of the book is remarkably practical. All the vegetables, including many that are little known but desirable, are considered in alphabetical order, from agrimony and artichoke to yam and zitkwa, and at the end there is a table of seed longevity and ounce values. Each vegetable is considered from every important point of view. Under "Onion," for example, there are these subheads: "General Information," "Soil," "Distances," "Depth to Plant," "Thinning," "Transplanting," "Culture," "Fertilizer," "Harvesting," "Storage," "The 'New' Onion Culture," "Diseases," "Pests." To have this book on your shelf is like having at hand an

experienced gardener, ready to answer all your questions promptly. Some other good books will be referred to later on.

INCREASING THE YIELD

Mr. French does not claim too much when he says that the information brought together in his book from many sources "is enough to increase by half the yield of many a garden"—which illustrates the importance of brains in raising vegetables. Here is a sample of his wisdom:

A still better method of hand sowing consists in making the drill deeper than directed, scattering along it some good chemical fertilizer, rich in nitrogen, and covering this with earth before sowing the seed, which direct contact with the chemical would injure. The fertilizer, thus placed, gives the plant the much-desired *quick start*, with a supply of food for later growth.

Whatever seeds you sow, try to give them this quick start by using the kind of fertilizer or manure indicated in Mr. French's book. Such a start is of superlative importance because of our hot summers and possible frosts in September. Take corn, for instance. To give it "the 'pep' and vigor so necessary to win the race with the weeds, weather, and especially that wary contestant, Jack Frost," as L. F. Graber remarks, it must have some quickly available commercial fertilizer from the very start, well mixed with the soil. (Bone meal and muriate of potash are particularly good; or you can use a little powdered hen manure or commercial

sheep manure in each "hill.") Mr. Graber tells of a test case where a fertilized part of a field was, after six weeks, a foot and a half higher than the unfertilized corner and yielded more at the rate of over twenty bushels an acre!

WEEDS AND HOES

An early start will, however, do little good if weeds are allowed to rob your crop of this fertilizer. At the Illinois Experiment Station we read that "with a well-prepared seed bed where weeds were allowed to grow with corn the average yield for an eight-year period was only 7.3 bushels an acre, compared with 45.9 bushels where the weeds were scraped off with a sharp hoe."

"Scraped off"—focus your attention on those two words. If weeds are *scraped off* several times a year, soon after a rain, they can do no harm and you will in one hour do a job that after the weeds are big and deeply rooted will take you five hours, not to speak of the harm you will do your vegetables by partly uprooting them, too.

Hoeing is always hard work, but think of the glorious appetite it gives! I generally appease mine, so far as breakfast is concerned, right in the garden. (I work two or three hours before breakfast.) A raw yellow turnip, a small raw carrot or two, the peas in half a dozen or more pods, a radish, and a tomato right off the vine make a feast for the gods—sweet, juicy, rich in vitamins as no cooked food ever is. Really,

you *must* have your own garden! Sweet corn, too, is—let me say it again—more sweet and flavorsome raw than cooked—that is, if eaten at once. Still, I should hate to give up the boiled or roasted corn with sweet butter and salt. And shall I tell you something—something that will make you as happy as a stick of candy did when you were a little boy or girl?

You have, of course (when nobody was looking), after biting the kernels off an ear of corn, taken the cob between your teeth, closed your lips tightly on it, and sucked and sucked and sucked. Sugar cane isn't sweeter, nor is maple sap. But what I think you do not know is that the flavor of no two cobs is exactly alike. I made sure of this years ago. We usually can about one hundred and fifty ears at once, and when the corn has been cut off and the cobs put into tin pails for the pigs, I get ahead of them by sucking two or three dozens of the cobs. It's "linked sweetness long drawn out," I assure you, and the subtle nuances in the flavor are astonishing.¹

FRAGRANT LUSCIOUS MELONS

Sweeter than the sweetest corn, raw or cooked, is the melon, particularly the canta-

¹ Plant breeders, professional or amateur, could and should improve the flavor of the best corn by studying these nuances, and selecting for the next crop those ears which are sweetest. This can be easily done by putting a numbered tag on each ear you suck and a tag with the same number on the second ear on the same stalk.

loupe, and this is always eaten raw, although I have read that in southern France some kinds are made into jam or preserved. Successful melon raising is, unfortunately, possible, as a rule, only where the summers are too warm for our own comfort, for they demand warm nights. So luscious, however, are they that I try them every year in my Maine mountain garden, and once in a while I succeed fairly well. I wouldn't waste time on them in such an unfavorable locality if it were possible to buy the best kinds. Those sold in city markets and peddled in the country are always a lottery; in a dozen you are lucky if you find two or three that delight the nose and the palate. In restaurants they are usually served iced, which destroys what little flavor they had. One is more likely to have luck with the Honeydew melon, which is as fragrant as a peony—unless it is picked and sold before it has ripened on the vine, which is too often the case. Never buy or gather a cantaloupe unless it is quite fragrant; the riper it is, the richer the perfume.

Melons are such a lure to my epicurean soul that I sometimes think it is foolish to spend my summers in our coldest state, where I cannot raise them. However, I have a strong imagination and an enviable faculty for remembering sense impressions and gastronomic treats, so that I get considerable pleasure from just reading about melons. Particularly in that

wonderful ten-dollar book of eight hundred pages called *The Vegetable Garden* (E. P. Dutton & Co.). It is translated from the French of the famous specialist, Vilmorin-Andrieux, with additional pages on English and American varieties by W. P. Thomson. To the melon thirty pages are given, and when I read, e.g., regarding the Persian melon, that the flesh is very thick, that it is almost without any rind and almost entirely filling the fruit, rather firm, but "very finely flavored, juicy, sweet, and highly perfumed," and that in that country there is a great number of varieties of melons of which "travelers speak in terms of admiration," I want to buy a ticket for Persia immediately.

One must look over the pages of that huge volume to realize that vegetable eating, in our own country, is still in its infancy. We think we know something about potatoes, for instance; but read the fifty pages devoted to them by M. Vilmorin-Andrieux and you will realize what an amazing variety of these tubers we have yet to sample and enjoy. Let the French teach us about them; teach us also how to cook them and other vegetables as only the French can cook them; teach us, furthermore, to insist on our rights. "In Paris," as Mr. Robinson writes, "the cook has the upper hand, and no grower dare send him the wooden fiber which is so largely sent as vegetables to the London

market." No doubt in a few generations London, and our own cities, will catch up with Paris. In the meantime let us raise vegetables in our own gardens and cook them the French way.

Or dress them the French way when you grow lettuce, romaine or other salad plants. Of these I shall speak in a later chapter. I regret to say that little progress has been made in the appreciation, in this country, of the best of all salad plants—escarole—since I made a passionate plea of several pages for it in my *Food and Flavor*. In the restaurants there has, however, been a tremendous and gratifying increase in the demand for salads for both lunch and dinner. Greens are full to the brim of vitamins (think of the cattle and horses which gain all their strength from grass!); and these vitamins (probably simply mineral salts) seem to pass, like fruit juices, right into the blood and do their work at once. Greens with fruit will be the lunch of the future, in town as well as country.

CHAPTER IV. FAVORITE GARDEN FLOWERS

IN ye olden days it was customary to grow some of the flowers in the vegetable garden. I have adopted this custom. Not that a well-groomed vegetable garden needs any floral ornaments. What could be more decorative than the flowers of a row of scarlet-runner beans climbing to the top of poles twelve feet high? What more beautiful than potato or okra blossoms? What more imposing than the huge golden pumpkin blossoms, or more picturesque than the ripe green or yellow pumpkins themselves, studding the field after the corn has been cut, or the luxuriant vines on which they grew, overgrowing the whole garden if you let them—and why not after most other crops are in?

Before the corn is cut, how gracefully its broad, rustling leaves wave in the wind! How stately are the pollen-laden tassels which fertilize the silk that starts the ears! What delicate shades of green and yellow and red in the leaves of carrots, beets, chard! Parsley needs no hair curler to look well, and crimped Savoy cabbage fascinates the eye. Red ripe tomatoes (cultivated until half a century ago only for their beauty—"love apples," they were called) peep from the green foliage. No, I say it again, the vegetable garden needs no borrowing from the flower garden to make itself

æsthetically attractive. To cap the climax, what flowering plant surpasses the multicolored stripes of Burbank's Rainbow corn, or the feathery fluffiness and rich green of asparagus?

I used to wonder why so many farmers have no vegetable gardens, not to speak of flower gardens. As a matter of fact, a farmer's time is all taken up with his field crops and animals, though he may work from 5 A.M. to 9 or 10 P.M. As for farmers' wives, it is seldom their household duties allow them time and energy enough to have much of a garden, either useful or ornamental.

There are, however, two flowering plants which may be found on nearly every farm, particularly in New England. In traveling from New York to Portland, Maine, I have often amused myself trying to find a farm that did not have a big clump of lilacs. No wonder they are favorites, in view of their ravishing fragrance and easy culture.

NASTURTIUMS NO LONGER "YELLOW DOGS"

The nasturtium is the other favorite that may be almost always found somewhere near a farmhouse. Its being showy and delicately fragrant doesn't fully account for its universality. Other flowers are equally fragrant and lovely, but they are not so easily grown. The nasturtium is a little more trouble than the lilac because it has to be planted every year,

but it will stand more neglect than any other annual. Regardless of weeds and drought and impoverished soil, it continues to bloom till frost; and the blossoms do not have to be picked, like those of other flowering plants. There is a belief that the poorer the soil the larger the number of flowers in proportion to the leaves; but do not allow this doctrine to beguile you into starving your nasturtium plants. Give them a rich soil to grow in, for if you don't the flowers will not have those long stems which women who arrange bouquets consider so necessary. I raise only the climbing nasturtiums and give them all the elbow room they want. Usually I plant mine along one side of the poppy bed, which they overrun in riotous profusion after the poppies are gone.

In up-to-date nasturtiums the circular, peltate leaves—each looking “like a shield on the arm of a soldier,” or like lotos leaves, some of them oddly bleached, blotched, and striped—have a charm of their own which quite justifies their luxuriance. Whether in rows or clumps near the house, or hanging down from a wall or a tub, or climbing a fence or a rock, the nasturtium is always decorative. Its fragrance is not surpassed for delicacy and originality or individuality, or whatever you choose to call it, by any other flower. If the poets have not raved about it as they have about the rose and the violet, it is doubtless because neither its

common name nor the botanical "tropæolum" lends itself easily to the versifier's requirements.

As for its colors, I once knew a man who, while enjoying the fragrance of nasturtiums, hated the sight of them. "Yellow dogs," he called them—but that was years ago, before the nasturtiums had suffered a sea change into something rich and strange. From Colombia came a new species, the *Tropæolum lobbianum*, with red flowers, some of them so dark as to be almost black. By hybridizing these with the yellows the seedsmen got nasturtiums of almost all the colors of the rainbow, with fascinating stripes and blotches and shades in endless variety. Scarlet, bronze, cherry red, chocolate, creamy white, purplish crimson, blush rose—these and other colors you will find represented in named varieties in the seed catalogues.

Don't order any yellows; you will have them anyway, because some of the flowers revert to the parental colors. As Luther Burbank remarks, "It is exceedingly difficult to keep the colors of the various nasturtiums separate." That doesn't worry me. I like particularly the French chameleon and the hybrids of Madam Gunter (also French), offering a wide range of exquisite colors and beautiful markings on the same plants. The loveliest nasturtiums I ever had were the "Coquettes"

offered one year by Burpee. They were so called because of their being, like woman in Virgil's line, "*varium et mutabile semper.*" Not only did no two plants have the same spots and stripes and colors, but on the same plant and vine all the flowers differed from one another—a real floral kaleidoscope. Unfortunately, this adorable variety was not perpetuated, probably because of the "reversion" difficulties which are so great in this flower. Because of its extreme variableness Luther Burbank specially recommended the nasturtium to amateurs who wish to become creators of new varieties of flowers. (See p. 186, Vol. X, of his *Methods and Discoveries.*)

But with a hundred other choice flowers waiting for a word of commendation, I must not dwell any longer on this favorite, which is unique in being so universal and democratic and yet so aristocratic and refined.

Have you ever seen one of the mail-order catalogues sent out by some department stores—huge volumes of nearly a thousand pages, describing and picturing tens of thousands of all sorts of things which somebody living in the country might want? Catalogues of flower seeds are not so voluminous as these, yet most of them list a bewildering variety of plants, not a few of which might as well be discarded. More and more I agree with E. P. Powell that "most of the annuals take more time and room

than they are worth." He devotes a long chapter of his *The Country Home* to telling what flowering plants of all kinds he thinks ought to be generally favored. His advice is sound.

If you wish to consult your own taste or use your own judgment rather than his—or mine—get a copy of Harriet L. Keeler's *Our Garden Flowers* (Scribners), a delightful book to lovers of flowers, giving not only botanical descriptions, with 276 illustrations, but telling whence they came, and relating their life histories and gradual improvement. The author modestly claims for her volume that it is only "fairly complete"—yet she had at her disposal 550 pages! Do not, therefore, scold me if in this chapter I call attention to only a few of the very finest and most highly educated plants which ought to be grown in all gardens the makers of which have brains, industry, patience, time, a good soil, and plenty of water.

The amount of time you can spare is the first thing to be considered. If you have plenty, it would be inexcusable not to grow pansies, poppies, and sweet peas. These I consider the most enjoyable, on the whole, of all garden flowers, and I have therefore given a whole chapter to each of them. There are perhaps a dozen flowers equally beautiful or fragrant, but some of them bloom only a few weeks, whereas the three favorites I have named can

be made to bloom from two to six or even eight months.

LET FRAGRANCE DECIDE

If your time is limited, plant flowering shrubs, or bulbs, or perennials in preference to annuals, because they are generally—if given a good start—better able to take care of themselves. Among a hundred lilac bushes there are probably not three which receive any attention, yet, ever faithful, they bloom from year to year. Almost equally independent are most other hardy flowering shrubs. Among the multitude to select from, choose by all means those which, like the lilac, delight the sense of smell as well as the color sense.

Earliest of all flowers in our parks is the Tartarian honeysuckle, the blossoms of which are in such a hurry to perfume the air that they do not wait for the leaves to appear. You also want, of course, one or two syringa bushes, also called mock orange; but be sure to get one of the varieties which really do mock the delicious perfume of the orange blossom; some don't and are therefore disappointing.

Hydrangeas are coming more and more into favor, and so are the Japanese deutzias and snowballs, but these are not fragrant. Nor is the dogwood, or the spirea, one variety of which (Bridal Wreath) has been called the most beautiful and useful of shrubs. But the striking

new ever-blooming butterfly bush has a pleasant scent. If you want to be intoxicated by fragrance, be sure and grow a calycanthus, or strawberry bush; its odor is ravishing, unforgettable. I have kept in my memory for more than half a century the moment when, in exploring a deserted farm, I came across a calycanthus bush and drank in the voluptuous sweetness of its wood and flowers.

Among the hardy climbers there are some, like the feathery clematis, the house-climbing ampelopsis (Japanese or Boston ivy), and the English ivy, which are very desirable for decorative purposes, yet they appeal to only one of our senses, whereas cinnamon vine, the Japanese (Hall's) honeysuckle, and, above all, the wistaria, also thrill with their fragrance. A doubtful lover who can lure his adored one into a wistaria bower will find her quite unable to say "No" in such a blissful atmosphere.

Of roses, which are both climbers and bushes, there is nothing I could say which has not been said enthusiastically a thousand times. There are more than five thousand species and varieties; the best of them are briefly described in the catalogues of seedsmen, who also usually supply free leaflets telling about applications of liquid manure and bone meal and winter protection and other things amateur rose growers should know. My only bit of advice is, select those which, besides lovely color and

form, also have fragrance. Why buy half a loaf when for the same money and care you can get a whole loaf?

Mr. W. J. Chittenden, F. R. H. S. and editor of *Garden Life*, in the splendid article on roses contributed by him to *Black's Gardening Dictionary* (a most useful volume of 1,237 pages), refers to the keen disappointment felt by flower lovers because so many fine roses lack the charm of fragrance. "In the old-fashioned Hybrid Perpetuals fragrance was more common than it is among the present race of Hybrid Teas; it is, however, satisfactory to note that many of these are deliciously scented, and some raisers make this one of their ideals." He gives the names of fifty varieties in which fragrance is especially pronounced.

WHY BULBS AND PERENNIALS?

Flowers from bulbs are usually so lovely and so easily grown that there is no excuse for not having some in every garden. Even the busy farmer's wife can find a few odd moments in the autumn to remove a small portion of turf here and there, loosen up the soil and mix with it some bone meal or old manure (fresh manure should never be used with bulbs), and then replace it firmly after inserting a crocus or narcissus bulb. If this is done on an ornamental lawn the mower must spare these spots until the bulb's leaves have become yellow.

It cannot be denied that the crocus, the narcissus, the tulip, the hyacinth, and most other flowers grown from bulbs bloom only a short time. Many hesitate, on that account, to give them whole beds to themselves. But this is not necessary. The leaves of these plants die and disappear soon after blooming, which leaves the field clear for other flowers. While the tulips, etc., are still in bloom you sow in among them the seeds of annuals like portulaccas, petunias, poppies, verbenas, dianthus, cosmoses, which in turn pass away when the autumn frosts come, thus leaving the ground clear for the bulbs to push up again the following spring.

Hyacinths are exquisitely scented, which is an additional reason for growing them; so are daffodils, jonquils, and other varieties of narcissus, like the poeticus and polyanthus or nosegay narcissus. Sweet-scented are the freesias and many of the lilies—above all the hemerocallis, or yellow lily, a bed of which simply must be included in every epicure's garden. Some of the tulips, notably, among the cottage tulips, Mrs. Moon, Columbus, and the Gesneriana (*Lutea*, *Lutea pallida*, and Major; I should like to know something about this Gesner), and among the Darwins the Pride of Haarlem, are distinctly sweet scented. Others have only a sort of faint generic tulip odor.

For the eye the most beautiful tulips are the

Darwins and the well-named parrot tulips, which look almost as exotic and orchidlike as gladioli. I asked Luther Burbank why he has not got busy intensifying the fragrance of some of the tulips, as he has done in the case of other flowers, like the larkspurs, callas, dahlias, verbenas, and some lilies, especially the callas, to which he has imparted the odor of the Parma violet, the rarest of violet odors. He answered: "Tulips do not thrive very well in our particular locality, but they can all be made to have fragrance. The gladiolus," he added, "will sometime have fragrance." I sincerely hope so.¹

This is a matter of very great importance to flower gardeners and breeders. If you have studied the seedsmen's catalogues for the last two or three decades you will know that *fragrant flowers are coming more and more to the front*. "It is probably true with regard to fragrance, as with regard to combinations of colors, that there are unrevealed hereditary factors in the germ plasms of most flowers," says Burbank. To him fragrance is "the very soul of the flower." With all its attractive qualities, he found the dahlia "not quite a perfect flower because it lacks fragrance." "There is no line of experimental work with the flowers that should be more attractive than the develop-

¹ For some very interesting remarks on enhancing the fragrance of flowers see Burbank's vol. ii, p. 80; ix, 23-29, 219, 247; x, 107-110. Read also the summary in Harwood's *New Creations in Plant Life* (Macmillan), chapter on "Breeding for Perfumes."

ment of fragrant varieties of some odorless flowers," he declares. One of the chief manufacturers of perfumery in this country took the liveliest interest in Burbank's work along this line. He remarked that one of the main reasons why perfumery is not extracted in this country is because people pay so much attention to large things in agriculture—thousand-acre farms and the like—when, in reality, far more money could be made along intensive lines; as, for example, in the line of perfumery production.

Most kinds of garden flowers are far more beautiful in shape and varied in color than they were in the days of our grandparents. In some of them it would seem as if the limit of beautification had been reached. *I am therefore convinced that during the next few decades the breeders of ornamental plants will devote their attention more and more to the fragrance of flowers, following the lead of Luther Burbank.* In that direction there is room for much improvement.

PEONIES AND PERENNIAL PHLOX

Hardly had I written the foregoing page when the rural postman brought me the fall catalogue for 1921 of one of the largest and most reliable seedsmen. Opening it at random on page 27, the heading "Dreer's Fragrant Peonies" stared me in the face—an instance showing how the emphasis is beginning to be

placed on fragrance. There are a great many varieties of peonies—more than a thousand—and a large proportion, while lovely to look at, are unscented or even have an unpleasant odor. Mrs. Edward Harding devotes nineteen pages of her superbly illustrated *Book of the Peony* (Lippincott) to a list of 125 superior varieties, marking those which are fragrant with an X and excluding the ill-smelling varieties altogether. The rose peony has an odor singularly and deliciously like that of the rose. Other sorts vary in odor almost as widely as in color markings. In the *Bulletin* of the American Peony Society (No. 2, 1916) A. H. Fewkes calls attention to the curious fact that color seems to have some influence on odor. While the full double rose-pink varieties are the most fragrant, the single or semidouble reds are inclined to be ill smelling, and the full double reds, in most instances, lack odor entirely. The scented kinds run “the entire gamut from a pleasant freshness of odor up to intoxicating fragrance.”

To speak of the “intoxicating” fragrance of some peonies is no exaggeration; nor does Mrs. Harding use too strong language when, in writing about the wonderful shapes and texture and colors of peonies, with their glossy silken petals in a hundred shades, tints, and combinations of white, pink, yellow, and red, she declares that “one who sees for the first time typical speci-

mens of the modern peony is thrilled with their breath-taking loveliness; even those who know well all the fascinations of the flower are stirred by it to new wonder and delight each recurring year." The rose, she declares, "fine, exquisite, and fragrant as it is, must yield first rank to the modern peony, which by reason of its sheer wealth of splendor and majesty of presence is now entitled to be called the Queen of Flowers."

Long ago the Chinese called it Sho Yo, which means the "most beautiful" of flowers.¹

From Texas, the connecting link between the United States and Mexico, comes one of our most dazzling colored annuals—*Phlox Drummondii*; one of its names, indeed, is Pride of Texas. It is so popular that one of our leading seedsmen, James Vick, alone has a crop of twenty-five acres of it in separate colors—white, salmon, pink, scarlet, rose, eyed or striped or plain—but always dazzling; the Greek word phlox means flame. Vaughan considers it "the showiest and most easily raised of all annuals." Much of its rainbow splendor is, of course, due to the efforts of hybridizers, but even as it grew wild in Texas a century ago the

¹ Full cultural directions, etc., are given in Mrs. Harding's volume. She warns against mulching with manure in the fall. Use bone meal and wood ashes to enrich the soil. Henry A. Dreer of Philadelphia has issued, for 25 cents, a pamphlet of 78 pages, *Hints on the Growing of Bulbs*, which gives all necessary cultural directions for peonies, phloxes, irises, lilies, begonias, gladioli, and the favorite other plants grown from bulbs and roots. A good book to have on your shelves is Mrs. Ely's *A Woman's Hardy Garden*.

Phlox Drummondii must have been very lovely. An Englishman who in 1835 sent some seeds home was rewarded by having his name immortalized in connection with it. It is not often that fame is so easily won.

Native Americans, also, are the perennial phloxes. E. P. Powell places these, among perennials, right after roses and lilies—and who but a peonyite could disagree? I cannot imagine my summer home without groups or rows of these tall, stately plants; their fragrance (stronger than that of the annual phlox) is uniquely agreeable and varies in the different varieties, as does that of peonies and lilies. Be sure and get your roots—which it is best to set out in the early autumn—from a reputable dealer, and to select named sorts, thus avoiding the mediocrities which infest flower gardens like everything else. To avoid frequent watering later on, dig the soil two feet deep and put in a lot of moisture-retaining well-rotted manure and leaf mold, with which bone meal and wood ashes should be mixed. But remember that, like most perennials, phloxes, to blossom freely, need several *thorough* waterings just before and while they bloom.

The blooming period can be made to extend from June to October by breaking off the spikes as soon as the multitudinous flowers have dropped off.

In the case of the peonies the blooming

period cannot be thus prolonged; but by selecting early, midseason, and late varieties it can be extended to about two months.¹

LILIES, IRISES, AND GLADIOLI

I have already given peremptory orders that a small bed of *Hemerocallis flava*, or lemon lily, simply *must* find a place in every epicure's garden because of its ravishing fragrance. But there are other lilies no less alluring by their scent, not to speak of their lovely shapes and colors. The hemerocallis is also called "day lily" because each flower blooms only a day, but there are many others to succeed it, and it has the advantage of "needing no coddling," whereas other varieties do better in partial shade than when exposed to the sun's full glare.

All lily bulbs are easily damaged by careless exposure or direct contact with manure. But by using your brains you can have glorious success with any and all of them. "I have had nine hundred Madonna blooms in a single bed of a dozen feet in diameter," writes Mr. Powell; "the fragrance, pure, strong, and wholesome, filled my garden and shrubbery. I do not know of anything more perfect than a stalk of lilies three or four feet tall, and crowned with five to

¹ See Mrs. Harding's peony book, pp. 105-115. Seedsmen ought to follow her example in indicating the relative period of blooming. Also—and this is very important—the seed catalogues should invariably refer to the fragrance of all flowers that have it.

eight blossoms, each six inches across, and waving perfume like a censer."

Waving perfume like censers are also the *Lilium longiflorum giganteum*, or Japanese Easter lily; the gold-banded *auratum*, also from Japan; and the lily-of-the-valley, the little white bells of which seem as if cast of condensed fragrance. These often run wild in shady places.

It is odd that the American wild lilies, which are so wonderful in California and Arizona, do not do so well in our gardens as those that have been imported from Japan and China. A new lily, *myriophyllum*, brought from China by E. H. Wilson, is featured by Vick; its perfume "reminds one of jasmine."

There are also plenty of unscented lilies; they will be more honored when some plant breeder has perfumed them. "The perfume of the flower and the flavor of foods are nowadays receiving more attention than formerly," says Mr. Burbank. He calls attention to the fact that individual lilies, even of the wild species, vary, some having a really delightful fragrance, and some none at all. This gives breeders a chance to accentuate the perfume in crossing the different individuals and shows how our whole flower gardens may ultimately be made fragrant.

Surely there can be no more interesting subject to flower lovers than this *creative garden-*

ing of the future. The time will come when all bouquets will be *nosegays*—that is, bunches of *fragrant* flowers. If you have inherited a Puritanical strain from your ancestors, please bear in mind that floral fragrance not only gives a sensual pleasure which is highly refined and harmless, but has indeed a decided hygienic value; because it makes us breathe deeply and in sniffs, which is the most effective way to introduce into the lungs an extra amount of health-giving oxygen—about one-third more than we ordinarily take in.¹

Less intensively fragrant than the lilies, but far more varied in coloring, are the members of the iris family (“rainbow flowers”), which includes, besides the iris proper, the humble crocus, the tigridia (of which some wonderful hybrid specimens are pictured in colors in Burbank’s tenth volume), and the glorious gladiolus. If you have room in your garden, and time to keep out the weeds—especially witch grass—by all means have some Spanish and German irises. Bigger and more thrillingly beautiful are the Japanese irises, than which nothing more showy exists. These are obligatory. You

¹ If you wish to realize fully what that extra amount of oxygen means, read Thomas R. Gaines’s volume on *Vitalic Breathing* (Chicago, The Reilly and Lee Co.). There is no exaggeration in his claim that deep breathing, in sniffs, “arms you against disease; prevents bodily fatigue (in spading and hoeing, for example); oils up your mental machine; insures physical fitness; and arrests premature old age.”

don't always get just what you ordered, even from the best seedsmen, and yet you will not be disappointed, so superlatively lovely are all these flowers, on the improvement and variegation of which the most flower-loving nation in the world has spend many centuries. Unlike the Japanese chrysanthemum, of which the same may be said, the Japanese iris is perfectly hardy. It will not bloom unless freely watered, yet it does not flourish in soil which is habitually boggy, though it loves to grow along brooks and is therefore desirable for landscape gardening.

"If the gladiolus were perfume giving," says E. P. Powell, "it would be the ideal flower for country cottages." It is so, anyway, I must inconsistently confess. Some kinds of flowers are showy at a distance, but offer no subtle markings or tints for detailed admiration. Chrysanthemums and asters are of this class; so are hollyhocks—of which you, nevertheless, ought to have a row among your hardy perennials—golden glow, and even peonies. But the gladioli! As dazzling at a distance as salvias—the cardinal birds among flowers—they are at the same time as thrillingly varied in subtle tints and stripes and blotches as pansies. Indeed, I know a man who told me he was going to give up pansies and devote himself exclusively to gladioli. I forgave his foolishness because, really, in face of the latest gladioli, with the dazzling modern improvements, anyone might

feel tempted at times to swear off on all other garden flowers. And that in spite of its being unscented!

During the past few years wonderful new combinations of colors and shades never before seen in any flower except tropical orchids have appeared in bewildering variety and abundance, so that it is no longer possible to give them names, for the tender transparent orchid shades blend in endless poems of color.

So writes Luther Burbank of the gladiolus, to the improvement of which—after many other breeders the world over had beautified it for nearly a century—he gave part of forty years of his life. He has had in his California gardens one hundred thousand absolutely new varieties of about every form and color ever produced from this wonderfully variable plant, including scarlet, crimson, yellow, blue, purple, lavender, orange, salmon, and pink, with infinitely varied combinations of rainbow colors. Such a mass of various brilliant colors cannot be produced at many times the cost of these in any other flower.

Burbank's eloquent description of the gladioli affects one like the climax of a symphonic poem played by full orchestra after a long and gradual crescendo. Beyond the present-day glorification of this rather plain flower as originally brought from South Africa, the gardener's art cannot go, except in the matter of perfume.

THE MOST ALLURING OF THE ANNUALS

Gladioli are a sort of connecting link between perennials and annuals. In the North they are,

unlike most other bulbs, planted in spring. I have had them winter outdoors in Maine and come up in May, but not so perfect as the first year, and it is best, in our Northern states, to treat them as annuals, planting them every spring in a new place, enriched with well-rotted stable manure or commercial sheep manure.

Annuals are, as I have already intimated, more trouble than flowering shrubs or climbers or blossoms grown from bulbs and perennial roots. The seeds of many are so small that, unless spring rains are frequent and the soil rich, failure is certain unless brain and brawn and patience are freely and constantly exercised. More will be said about this in later chapters.

Another difficulty with annuals is that there are so many kinds to claim our attention that the choice becomes a very puzzling matter. In the chapter on "The Fragrant Soul of Flowers" I shall indicate a way of making a living nosegay of your whole garden, or a section of it. Verbenas, pansies, sweet peas, petunias, stocks, wallflowers, tuberoses, schizanthuses, nicotianas, heliotropes, lemon verbenas, cornflowers, clove pinks or carnations, lupines, marigolds, are fragrant, most of them delightfully so; while among those which have no agreeable scent are the lovely ground roses called portulaccas, Chinese pinks, scabiosa, kochias or Mexican fire-bushes, zinnias, asters, dahlias, begonias, anemones, cockscombs, balsams, œnotheras (Bur-

bank's are wonderfully big and beautiful), cosmoses (graceful and prettily colored), morning-glories, and so on.

Nearly all of these, both scented and un-scented, have been so amazingly varied and beautified that, as you see them pictured and read about them in the seedsmen's catalogues, you feel tempted to try them all. And why not? "Why not?" you echo. "I cannot spend all my time in the garden, besides employing a gardener or two." No need of it. You can sample and enjoy all the annuals that seem worth while, in the course of a few years, and without caring for more than one long flower bed at a time.

When I was a boy my sisters and their friends used to have crazy-quilt parties, and I suppose such parties are still in vogue. Each girl brought a few squares of silk or other material, and then all sat around the wooden frame which held the quilt and sewed their contributions on to it. Flower beds can be similarly "quilted." Some seedsmen offer packets of mixed seeds of garden or wild flowers; but if you have an extra dollar to spare you can buy separate packets and make your own mixture, shaking it well, like a medicine bottle, before sowing. Cosmoses, poppies (Darwins, Burbanks, Shirleys, and silver lining), marigolds, mignonettes, stocks, phloxes, four-o'clocks, heliotropes, verbenas, zinnias, and the old-fashioned cornflowers or bach-

elor's buttons—suppose you make a crazy quilt of this dozen the first year. The next season you are likely to want whole beds of some of them, particularly verbenas and cosmoses. I always have a separate bed of cornflowers around the stem of a locust tree. They seed themselves, begin to bloom before any other annual, and, if given a few handfuls of wood ashes before rain or an occasional shower bath, will bloom four or five months. The greedy tree rootlets do not kill them. I have known cornflowers to survive several decades self-sown in an Oregon apple orchard. They are patriotic, too, with their red, white, and blue flowers. I prefer the single kind, but grow also the doubles because of their different colors. Cornflowers have an agreeable perfume, but it is so faint that it probably escapes many who nose it. It would be easy to intensify this fragrance by continuous selection of the sweetest flowers for seed. Nothing could be simpler. In view of the wide popularity of cornflowers it would surely pay our seedsmen to do this work. They should also take in hand the "poor man's orchid" (*schizanthus*), whose quaint blossoms, varying from blond to dark brunette, are always in my garden. They are seldom fragrant, but should be made so.

Of course you will have the equally patriotic morning-glories climbing somewhere in your grounds. These will do well anywhere—even in

a city back yard which gets hardly any sun. Another annual climber which should be grown in every garden—especially if there are young children in the family—is the ornamental gourd. The flowers of some of the gourds are pretty, but it is the oddly shaped and prettily colored gourds themselves that make them fascinating toys for children of all ages. Perhaps the four most interesting sorts are the Japanese nest egg, the mock orange, the pear-shaped (beautifully striped green and yellow), and the prettily marked pomegranate or sweet pocket melon, which is as aromatically fragrant as a vine-ripened Honeydew melon. While these gourds are warm-climate climbers, I have grown them successfully in the Maine mountains. We use the nest eggs in the henhouse, and the ripe pomegranate is a whole nosegay in itself. I always carry one in my pocket in September.

If you are interested in ornamental plants which are grown for their beautifully colored and marked leaves—such as coleus, castor bean, caladium, and heuchera, ribbon grass, eulalia Japonica, aloes, agave, *Asparagus Sprengeri*, dracæna—don't omit to add Burbank's Rainbow corn. What he says of this in his catalogue is not in the least exaggerated: "The leaves of this beautiful corn are variegated with bright crimson, yellow, white, green, rose, and bronze stripes. A really wonderful decorative plant, as easily grown as any common corn and fully

equal in beauty to the most expensive greenhouse dracænas." I always have a row of these in my garden, and automobile parties have repeatedly stopped to inquire about these showy plants.

I value the Rainbow corn even more than the Mexican firebush (kochia), a row of which, green and fluffy during the summer, does indeed look like a row of burning bushes in September, when the millions of minute flowers, as well as the small leaves, turn a fiery red. When the setting sun illumines my kochias I almost feel surprised not to see smoke rising from them.

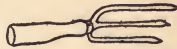
Let us now see what are the most important things needed if we would have a successful vegetable or flower garden.

CHAPTER V. HOW TO START A GARDEN

HAVING selected and purchased—the sooner the better—the seeds of preferred flowers and vegetables, the next step to take, long before the ground can be tilled, is to secure a supply of necessary garden tools.

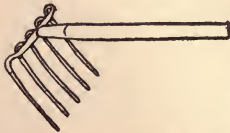
Many kinds of these are pictured in the last pages of the seed catalogues and all of them have their uses. Four of them are indispensable. Without a spade, a hoe, a trowel, a rake, gardening is impossible. But there are at least four more implements which I should be very sorry not to have. They are:

1. A three (not four) pronged hand fork like this. This is often more handy and helpful than a trowel, but not in transplanting, for which, by the way, a narrow trowel is often more useful than the ordinary kind. A large spading fork is often preferable to a spade or shovel. Buy one.



Gem Hand Fork

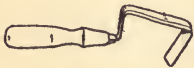
2. Very useful and labor saving is a five-pronged potato hook (prong hoe), not only for digging potatoes, but also as a substitute for spade, spading fork, or shovel. If your garden approximates half an acre, much



Prong Hoe or Potato Hook

labor can be saved by having it plowed and harrowed just before your trees leaf out in spring. But plowing is not sufficient. After the harrowing has been completed, stake off the rows where the peas, beans, corn, etc., are to be planted, and loosen the soil still further with a potato hook, digging down to a depth of twelve to eighteen inches. Spading with spade, hoe, or fork would do the job equally well, but would be much harder work. There are ways of plying spades, forks, and hoes of all kinds which are much less fatiguing than others. Use your brains and you will soon discover them. And don't forget the vitalic breathing referred to on page 47. It may enable you to do without an assistant.

3. The hoe is most commonly used for weeding, but unless it is used simply for scraping off the young weeds with their tiny roots it is apt to harm the roots of your crops. Hand weeding is best, if the weeds are more than an inch or two high. It is easy after a rain or irrigation. At all times it is greatly facilitated by using any one or all of the weeders here pictured. You will be delighted with them. If your garden is far away from a city I would advise having two or more of



Hazeltine's Hand



Eureka Weeder



Excelsior Finger

each of these hand tools. They are small and easily lost. Make a strict rule to always put them back where you expect to find them.

4. A sprinkler, or watering pot, is convenient even if you have a hose and plenty of water, because often it takes much less time to carry a pot of water than to drag the hose to a remote corner where only a little water is wanted. Revolving or stationary sprinklers of another kind—meaning the metal end pieces that are attached to garden hose for letting the water come out in a fine spray and thus creating an artificial rain—are great time savers. To be sure, they share with rain the disadvantage of causing the soil to bake when the hot sun hits it. For best results this top crust should be broken up after every rain or watering, to let in the air which the roots need almost as much as the leaves do.

A rake is better and quicker for breaking this crust (which should be completely pulverized) because it isn't so apt to injure the near-surface roots as a hoe is. In flower beds where the plants are too close together to permit the use of a rake, the "Excelsior finger" is most useful for pulverizing the top crust. You will need it even if you are willing to use the best of all cultivators—your own fingers. Of course, hand weeding and cultivating is too slow work except in flower beds or small gardens.

In large gardens much time and labor can be saved by adding to your supply of garden tools a wheel hoe. Use it at once to remove the new crop of weeds that comes up after every rain. It has been truly said that, without exaggeration, "80 per cent of the work in taking care of gardens is due to the fact that these hoeings and hand weedings are allowed to go for several days after they should have been attended to"; which is simply an illustration of the old adage that a stitch in time saves nine. Gardening with brains saves brawn.

A hundred or more broad garden sticks, eight or ten inches high, for marking your rows of vegetables or flower beds are very desirable; and don't forget to write on each stick with blue pencil the name of each variety and the date of planting it. (The rows should run north to south.) You will also need a number of green stakes five or six feet long for your asparagus plants, if you have any, and for tomato plants, which you surely will have. In the North, to make sure of timely ripening, tomato plants should be a foot tall and starting to blossom when you transplant them, and they need a stake at once. For tying material I much prefer unbleached muslin torn into thin strips to twine, which cuts into the stems, or raffia, which rots in rainy weather. You will, of course, need a garden line or a ball of twine to make your rows of vegetables straight. Strag-

gling, crooked rows do not look well, besides being harder to cultivate.

A wheelbarrow, a sickle, a lawn mower, an asparagus knife, are likely to be wanted, and so is a pair of rubber boots to wear when watering or when the dew is heavy on the grass. Have a rubber coat, too, and a rubber hat, if you wish the best results in transplanting, which should always be done while it rains, unless it rains so hard as to turn dirt into mud.

In choosing a site for your garden, if the water stands on it all day after a rain, have tiles put in for drainage, or select another plot slightly inclined. A slight slope toward the southeast is the ideal garden spot; vegetables ripen a week sooner in such a sunny exposure and are less likely to be killed or damaged by late spring or early autumn frosts. See Chapter VII for further details on this point.

Almost any soil can be adapted to the growing of flowers or vegetables, provided there is sufficient plant food, or humus. This is a matter of tremendous importance to which I shall devote several pages in Chapter VI. Read them two or three times, ponder and obey, and you cannot fail to have a successful garden. With humus—and brains—miracles can be achieved.

So far, all's well. You have the seeds you want and the tools you need. You have selected the spot and enriched it with humus if it needed any. Now, how about sowing the seeds

and caring for them? Concerning this you will find hints in the chapter on poppies and on other pages, but a brief summary is in place here. Sweet peas, pansies, poppies, cornflowers, phlox are among the hardy popular flowers which may be planted in the beds outdoors as soon as the soil can be made ready. Nor will beets, onions, spinach, radishes, cabbage, turnips, chard, lettuce, or carrots suffer from late frosts. Wrinkled peas (the only kinds fit for epicures), salsify, kohlrabi, cauliflower, can follow soon thereafter—say, when the pear and peach trees bloom; but it is wise to wait for the apple blossoms before putting in the ground the seeds of corn (see Index), cucumbers, beans, okra, pumpkins, squash, melons.

Rake the top soil till it is fine. With a stick make slight depressions, sow the seeds thinly, sift a little fine dirt over them, and then press it down firmly with a shingle. If showers are frequent, nothing more is necessary. But to make sure of your seeds coming up, cover the ground, after they are in, with burlap (held in place by stones) and peep under it once or twice a day. If the surface soil shows signs of drying out, water it with a sprinkler without removing the burlap. Watch carefully for the seedling plants; some come up in five days; others take a week, two weeks, or even a month or fifty days (passion flower); but don't lose patience; you will have your reward—if you

don't let the baby plants die for lack of water! In warm, damp weather all seeds germinate several days sooner than when it is cold.

The most difficult thing to teach beginners is thinning. I confess that to this day, after half a century's gardening experience, I sometimes make a fool of myself by sowing too many seeds and hesitating afterward to pull out most of them before they are an inch high. Nobody knows better that if they grow larger they become spindling or consumptive looking and unable later on to bear large flowers; yet it seems so cruel to kill all these healthy young plants, each of which, if left to live, would prove a source of daily delight for weeks, that—well, you *must* be ruthless or you had better quit gardening; that's all.

In pulling out crowded plants, be very careful not to disturb the roots of those that remain, especially in the case of poppies. Do your thinning on cloudy days, if possible, or late in the afternoon. Ordinary weeding, on the other hand, especially when the hoe is used to scratch off hundreds of plants, is most effective if done early on a hot sunny day. That makes the weeds wilt and unable to gain a new foothold.

In a later chapter I shall speak of the weed sorrel as an indication that the soil needs lime. In my Maine garden I have never needed lime, but that may be because the soil is light and sandy and I use for most crops wood ashes,

which also correct soil acidity. If you wish to know whether your soil needs lime, get a piece of blue litmus paper in a drug store, insert one end of it in a tumbler of water thickened with dirt from your garden, and leave it for an hour. If your soil is acid the litmus paper will be intensely red. Lime is not a fertilizer in itself, but it makes inert plant foods in the soil more easily available.

To protect tender young plants from frost cover them on evenings when the thermometer falls rapidly with burlap or with newspapers held in place with stones. A smudge is less sure, and to make one you will have to get up before the sun. It's the first rays of the sun that kill. See Chapter VII.

To protect your whole yard against cats and dogs and poultry, some sort of fence is necessary. The cheapest is chicken wire. Shrubs or hedge fences are better looking but less reliable; but there are many kinds of ornamental fences. Concerning these and cold frames and greenhouses and garden furniture and bungalow summer gardens, window and porch plants, and rock gardens I must refer the reader to *The Garden Guide*, an excellent little book crammed with facts, published by A. I. De La Mare Co., New York.

CHAPTER VI. BRAINS, BRAINS, AND MORE BRAINS

WHEN Rossini was asked what were the most important three requisites for a singer, he promptly answered, "Voice, voice, and voice." If I were asked what are the most necessary things for a gardener, I would answer, "Brains, brains, and brains." It takes infinitely more intelligence and knowledge to be a successful gardener than to be a popular singer of the kind Rossini had in mind.

It is all very well for a poet to talk about tickling the soil with a hoe and making it laugh with a crop, but if you think it's as simple as that, try it and you will have the biggest surprise of your life coming to you.

Most gardens are too tired to laugh when simply tickled with a hoe. They need food and stimulants to brace up on—humus and phosphates and nitrates and potash and more humus. If your fertilizer contains 10 per cent of potash you can raise as many pounds of potatoes on half an acre or less as you can without potash on a whole acre. Think of the value of such knowledge!

If you consider sulphate of potash too expensive, burn hard wood and save the ashes, or buy them by the barrel; they contain from 6 to 7 per cent of potash and are therefore more

valuable for potatoes and other crops that dote on this chemical than most of the commercial fertilizers.

TECHNIC OF GARDENING

Was I right in saying a gardener must know a thing or two? What I have said is only a sample of the tremendous advantage a man who knows has in the garden over an ignoramus. It must be big knowledge, too; a little knowledge is a dangerous thing. If, for instance, knowing how ashes help your potatoes and carrots and beets and oyster plants, you apply them to your lettuce bed, you'll ruin it; the plants, instead of heading, will go to seed and quit. What they need is not the starch-and-sugar-producing potash, but a chemical which promotes leaf growth, like nitrate of soda, which, however, must be applied very carefully, so as not to burn the roots and leaves; or, better still, the rather expensive ammonium nitrate, "probably the fastest fertilizer we shall ever have."

Tickle the soil with a hoe, indeed! Most farmers do just about that in their gardens, and that's why they seldom have any vegetables, or any that are fit to eat. Instead of first tickling the soil, let me tell you what I do in my garden. After it has been plowed and the old stable manure harrowed in, I put in garden sticks to mark the vegetables I want to raise

in the successive rows, taking care that the corn and potatoes and peas and other crops change places from year to year. Then I get a pretty farmerette or two—a product of the war which almost makes one reconciled to it—or else a mere man, to help me do the rest; and, mind you, every detail, however trifling it may seem, is of imperative importance.

Gardening is a good deal like piano playing. The hands are important, but the brain must guide them every second, and the feet are needed for the finest results. The pedal has been called the soul of the pianoforte, and from a tonal point of view it is. Pressing the right-foot pedal raises the felt dampers from the strings, the result being that when you hit one key—say, C—you hear not only that tone, but a dozen others through sympathetic vibration, all of them blended into a rich, juicy tone which the hands alone could never produce.

Juicy vegetables are as dependent on the co-operation of the feet as juicy piano tones. Read Luther Burbank's chapter on "The All-importance of Water," in Vol. VII of his *Methods and Discoveries*. "The richest soil that was ever prepared would not grow a single blade of grass or the tiniest weed if that soil were absolutely dry." There are rain, to be sure, and irrigation, but these are not always available when needed. It is the baby plants that most need water; they need it every second, and the

way to make sure of it is to tread the soil firmly after the fertilizer has been thoroughly mixed with the soil in the furrow, and again, more gently, after the seeds have been put in and covered the right depth.

BE A GAMBLER

Peter Henderson was so impressed by the importance of the use of the feet in gardening that he wrote a special circular on the subject.

Of course, if you are satisfied with coarse, tough, stringy vegetables, such as most people live on, you needn't attend to these details; but I am writing as an epicure for epicures. In a later chapter I shall try to determine just what kind of an animal an epicure is.

To be a successful gardener one must not only have brains and be a foot man as well as hand laborer, but one must also be a gambler. The trouble with most of our farmers and gardeners is that they are afraid to take chances. During the two summers we spent on Mark Twain's place at Redding, Connecticut, our nearest neighbor was an Englishwoman, Mrs. St. Maur, who used her brains in gardening; in fact, she wrote a book, and a good one, on gardening. She was a gambler, too, not afraid to brave the dangers of late frosts, and the result was that she was usually eating juicy vegetables two or three weeks before others.

That has always been my way. What if a

crop is lost once in a while? It is easy to replant, and I always keep an abundant supply of seeds. To be sure, it is often said that children who are not sent to school till they are seven or eight promptly catch up with those who begin a year or two sooner, and the same claim is made for young plants. There is a good deal in this—there are two sides to all things—but on the whole it has been my experience that it pays a gardener to be a gambler, sowing the seeds recklessly as soon as the ground can be worked.

Luther Burbank began his career as a horticultural plunger. He knew that the early gardener catches the rich customer; and often he has put a hundred thousand seeds in the ground, vaguely hoping that one of them may grow into the particular plant he had in mind. The perfect gardener not only has brains. He is a genius, a creative artist. Of this more will be said later.

HUMUS, LEAF MOLD, AND FERTILIZERS

If the widow referred to in the Preface had used her brain it ought to have told her that it was as absurd to expect the plants in her garden to get along without enrichment of the soil as it would be to expect her children to grow up without their daily food and drink. Plants need a great deal less than humans, but what they do need they need badly.

Some gardeners are so lucky as to have soil so rich in humus and chemical elements as to need—for some years, at any rate—little or no plant food. Many other gardens do their duty thoroughly if they are enriched once a year with plenty of stable manure. But, thanks to automobiles and farm tractors, stable manure is becoming more and more difficult to buy and the cost is excessive.

The very important question thus confronts the gardener, "Where can I get food for my plants?"

The answer is, from humus and chemicals. The chemical food you can get from the seedsmen. Most of them offer, by the pound or hundred pounds, general manures useful for vegetables and flowers; and if they are up-to-date they will inform the readers of their catalogues what particular varieties their several kinds of manure are good for. They also offer the nitrates, phosphates, and potash compounds separately, and you will find it extremely interesting to study up this matter thoroughly, and ultimately make your own mixtures. French's book, to which I referred in the chapter on "Vegetables We Should Grow Ourselves," gives sufficient details for most purposes.

You will soon be likely to have in your woodshed a bag of nitrate of soda to accelerate the growth of plants grown for their leaves, like lettuce, cabbage, and spinach (peas and beans

gather their own nitrogen from the air); a bag of the phosphatic and safe bone meal for corn and most other crops, as well as for bulbs and perennials in particular. And you certainly, if you are wise, will have a large bag of pulverized sheep manure, which comes nearer than anything to atoning for the dropping out of the stable manure. Unlike many of the chemical fertilizers when used ignorantly, it does not burn tender roots or sprouting seeds or leaves. It certainly is, as James Vick claims, "the best fertilizer for the lawn, garden, greenhouse, and conservatory."

A friend of mine who lives near Philadelphia told me the other day that his soil is so hard that in some places he has to use chisel and hammer on it, and he wasn't joking. That soil needs, above all things, humus, humus, and more humus. Humus is also what light, sandy soil needs most, of all things, for sandy soil easily dries out under the hot sun and there is nothing like humus for retaining moisture, which it holds "like a sponge."

You want to know, I feel pretty sure, just what humus is. I don't blame you for not knowing; dictionaries used by millions do not include the word. But I have before me a book, *The American Educator* (invaluable to parents who wish to help to enlighten their children), which explains the word so tersely that I will cite its definition:

Humus—vegetable matter in a state of decomposition. Humus is rich in nitrogen, the material out of which the gluten in grains is produced, and it helps to conserve moisture in the soil and also improves its texture. Air space in the earth increases with the amount of humus. It may be added to the soil by the plowing under of green crops and by the application of barnyard manure.

Excellent so far as it goes; but the writer left out two very important sources of humus—leaf mold and vegetable refuse in the garden which is piled into a compost heap and allowed to rot. This should not include such things as potato and pea vines, which may harbor disease germs. These should be burned. The leaf mold is to be found several inches—sometimes many feet—deep in boggy places shaded by trees. If you have no bog you surely have a dozen or more trees which in autumn shed their millions of leaves. Rake these into a pile, wet it, tread it down hard, put some turf over it, or dirt to keep the leaves from blowing away, and the following year you will have a pile of leaf mold that will make a manure richer than any other in humus. Mix it with the soil so it will be under the seeds you sow.

GREEN MANURING

For small gardens leaf mold and compost heaps are the best sources of the necessary humus. For gardens large enough to be plowed, green manuring is the manuring of the future

in this increasingly stable-manureless age. It consists in plowing under a crop specially grown for this purpose. Various crops are used, but, as you want plenty of nitrogen in your soil, it is well to choose a clover for the South and hairy vetch for the Northern states; the vetch is so hardy that it does not winterkill even though buried for months under ice and snow; nor does it mind drought in the fall, when it is still young (having been sown in August). William C. Smith says of it:

Vetch is the best green-manuring crop because it stores more nitrogen in the soil than cowpeas, soy beans, alfalfa, or any other legume. Its root system is so extensive that it completely fills the soil with its hairlike roots for a depth of six or more inches. It produces a vast amount of forage which, when plowed under (in spring), rots quickly and does not interfere with cultivation. This heavy mass of organic matter turned under never dries out the soil, but holds moisture even in the driest of seasons.¹

If your garden is large enough, put vetch in half of it one year and on the other half the following year; then you will not need to bother about stable manure or other sources of humus; but you will still need chemical fertilizers in moderation for quick and large crops. It is best to use twenty-five pounds of vetch seed to the acre mixed with a bushel of rye seed. The

¹ *Country Gentleman*, July 19, 1919. Read also *Farmers' Bulletin* 515, *Vetches*. Get your seed of a reliable dealer; it is often adulterated and useless.

rye supports the vetch and makes the plowing easier.

The problem of watering is much simplified by thus putting plenty of humus into your soil. Still, the humus alone will not do it; nor will the hoe. Shallow hoeing after a rain, to break up the crust and create a dust mulch, is very important; but the long vines of peas and potatoes and tomatoes, the stalks of corn, and the leaves of carrots and beets and turnips, absorb and dissipate an enormous amount of moisture, in spite of hoe and mulch. This moisture has to be replaced by judicious and frequent watering. Salad plants, in dry weather, should be watered daily, for if there is a check in their growth they bolt and go to seed. That means much work; but the greens are worth it, not only because they make delicious salads, but because, more than any other plants, they abound in health-giving vitamins, or, rather, mineral salts; for Alfred W. McCann has exploded the vitamine theory.

GETTING STRENGTH FROM GREENS

My neighbor in Maine has in his barn a bull—a magnificent specimen of bovine physique and strength. That animal lives all the year on hay and water. Elephants live on greens and water. They are as strong as meat-eating lions—and I would bet on that bull in a fight with a lion. Water and greens, fresh or dried,

that's all! Green food is as important for us as for the garden.

The Italian laboring man is noted the world over for his strength and endurance. Like the elephant and the bull, he lives largely on greens—salads and other vegetables raised in his garden. It is from those greens that he gets his strength. They are full of the food salts which are essential for growth and repair. Try, for lunch, a small but solid head of lettuce with salt. In a few hours you will feel those vitamins in your veins like exhilarating wine, and you'll crave more the next day.

CHAPTER VII. WHEN VEGETABLES GET PNEUMONIA

“I DO wish I could raise a crop of potatoes or beans once in three years, anyway!”

It was in the frigid Grafton Notch, near the foot of Mount Speckle, that I heard this pathetic remark from the lips of a farmer whose garden, as on so many other occasions, had been ruined by an August frost, a sad spectacle for the autoists passing it on the way to or from the Rangeley Lakes.

“Usually we have a frost here every month in the year,” he said, “but once in a while a merciful fog saves our crops.

“I have no ambition,” he continued, “to raise pineapples and figs and bananas, but I do think it is hard on the poor farmer that most of the things we need most and like best are easily killed by the slightest frost—potatoes, beans, cucumbers, squashes, pumpkins, tomatoes, and corn. There is nothing equal to the sweet corn or the potatoes raised near the Maine mountains, but if you try it you are likely to raise Cain.”

Being an unlearned man, he attributed his loss to the fact that his beans and potatoes got too cold in the early morning and died of pneumonia.

Now, plants do die of what you might call pneumonia, but, strange to say, the cold isn't what makes them die. Many a time I have

seen my vegetables and flowers at five in the morning frozen stiff as icicles, but an hour or two later every one of them came out of its Arctic stupor smilingly and continued to revel in the luxury of living.

JACK FROST IS INNOCENT

The sun does the mischief, when mischief is done. Paradoxical as it may seem, he is the true inwardness of frost. Far be it from me to speak disrespectfully of the heavenly bodies, but I must say that in this matter of frost the sun behaves disgracefully. He is worse than any I. W. W.—infinitely worse, being a perpetrator of sabotage on a cosmic scale. Every autumn he destroys the world's gardens one morning in September or October, and then smiles benignly and whispers, "Don't you love me for the pleasant warmth I diffuse?"

Most people hold Jack Frost responsible, but Jack is not the naughty boy at all. He might say truthfully: "I cannot tell a lie. The sun did it." It is the rays of the rising sun falling on the frozen plants that make them wilt. Why this is so I don't know, and I don't know if anybody knows. But I remember how, as a boy, I used to help my father and brother make smudges to keep the rising sun from "freezing" the precious apple blossoms in our Oregon orchard. The apple trees themselves are, as you know, hardy; they prosper even in Grafton

Notch, although some are winterkilled when the ground freezes two feet deep or more before there has been a protective snowfall. One recent winter the thermometer hereabouts was twenty below zero before snow came. That's what killed my pansies and irises and most of our bulbs; nay, to our amazement, we found that even the hardy red and white clover everywhere on our place was temporarily put out of business.

PROTECTING FOG .

So far as frost is concerned, our garden is fortunately situated. It has a southeastern exposure, which is considered the best, especially when it slopes a little, as ours does. What is more important still, the Androscoggin makes a curve around our place, and on frosty mornings that river usually supplies a dense rescuing curtain of fog, which allows the plants to thaw out before the sun gets a chance to stab them with his rays. Usually, I say, and to that we owe the fact that our corn and cucumbers are sometimes saved when families that are not so near the river suffer disaster. But once in a while the fog is too slow, and then—but we are not to be caught napping!

One summer there was a frost late in June which ruined most of the corn in the neighborhood. Ours was saved because we all, including our farmerette friends, got up at four o'clock and covered the young corn plants, which were

six inches high, with newspapers, with the result that we enjoyed a sweet-corn season of seven weeks and two days—a thing unprecedented in this region. The best newspaper for this purpose—as well as some others—is the *London Times*. That year I brought up about fifty copies of it for protecting frozen corn from the deadly sun.

Sometimes the moon aids and abets the sun in its ruthless crop sabotage. I know that Professor Humphreys of the United States Weather Bureau is inclined to think the moon has no influence on the weather. Maybe it hasn't, but I know that it helps to aggravate frost. Weather proverbs like, "Moonlight nights have the heaviest frosts" and "Clear moon, frost soon," prove that the pernicious activity of our satellite was discovered long ago. Every experienced gardener and farmer dreads full moon late in spring and early in the autumn. Clear nights increase the formation of dew, but what I cannot understand is why frost on moonlit nights kills at a higher temperature than on other nights. It seems pure cussedness on the moon's part.

THE DEVILISH WITCH GRASS

There is one form of vegetation which the combined efforts of moon and sun cannot kill, and that is witch grass, also known as devil grass and by a dozen other characteristic names.

I have often denounced this vegetable mosquito, as it might be called, but it continues to multiply and flourish just as if I had never said a word against it. It is the chief cause of deserted farms, for it makes tilling the soil ten times as hard. I am not exaggerating.

During the war I read a little story about a score of American soldiers who, seeing a broken-down French peasant trying to till his field after the Teutonic devastation, came to his aid with their trenching implements. I wish I could hire twoscore soldiers to spend a week cleaning out the tangled witch-grass roots in my half-acre garden. Plows, harrows, hoes, forks, rakes, combs, and sieves would be needed—but would they do the job? Can witch grass be killed? It recalls the man in one of Mozart's operas who was condemned to be beheaded, then hung, then impaled on hot stakes and finally flayed alive.

However, do not despair. There are ways of killing witch grass. If you will send five cents (not in stamps) to the Superintendent of Documents at Washington for Farmers' Bulletin No. 279 he will mail you a pamphlet entitled *A Method of Eradicating Johnson Grass*. In it you will learn—and see it proved by photographs—that witch grass has not one rootstock only, like decent plants, but three—the primary, the secondary, and the tertiary; and that the tertiary ones sometimes—*horribile dictu!*—penetrate to a depth of four feet—

hinc illæ lacrymæ—that's why you weep in struggling with them. But if you will burden your brain with all the details set forth in this Bulletin you will be able to conquer the octopus.

Turn the land infested with this pest into meadow or pasture and keep the grass closely cropped, either by grazing animals upon it or by mowing it for one or more seasons. After a year, the land "should be plowed shallow, and the subsequent cultivation should be intelligently and efficiently done." But if you let any of the grass go to seed in a fence corner, woe unto you!

If your garden is too small to be plowed, you may try a method I have found effective. Spread newspapers thickly over the space you wish to rescue and put boards over them. In less than a year the grass underneath will be dead; even witch grass cannot live without air—it suffocates. Nor can it live unless some of its blades are allowed to grow undisturbed. If you will, therefore, go over your garden with a sharp hoe once a week and slaughter every blade as soon as it shows itself, you will ultimately make the rootstocks, tertiary as well as secondary and primary, curl up and die miserably. At least, that joyful tragedy has been triumphantly enacted in my garden.

CHAPTER VIII. MALE *vs.* FEMALE ASPARAGUS PLANTS

THERE is another plant besides witch grass that frost never kills; its name is asparagus. Have you ever eaten it fresh from the garden? No? Then you don't know what asparagus is. We were planning our twelfth trip to Europe a few summers ago, but the thought that our new asparagus bed would be in full blast made us hesitate. Few people have asparagus beds, chiefly, it is assumed, because it takes three years to get results. But there are other reasons. Having had no experience with this vegetable, I ignorantly assigned the asparagus patch to my wife as an easy job. But here is her report:

How I wish I could start afresh with my present experience and do it differently! From the very beginning it was exciting—and generally dismaying. We planted the seed after a long soaking, and then came days of waiting. No asparagus. At last we gave up all hope and left the bed to its own devices, when, like magic, up sprang a forest of tiny green needles. In a few weeks each determined little plant had grown a wee crown, and then thinning out meant rooting up with the aid of a trowel.

If you haven't unlimited time, patience, and strength of mind, don't try to grow asparagus from seed, in spite of the advice of experts who have proved that it is the best thing to do by far. I had the first two requisites,

but not the third. I couldn't pull up beautiful, healthy seedlings. Moreover, according to the experts, again, seven-eighths of the seedlings are worthless, the other fraction being recognizable by the straightness and height of the plants. This was an eagerly seized excuse for putting off the evil day of thinning out. No inexperienced grower realizes what is ahead of him. Endless hours I crawled along the rows, trying to decide which thirty or forty were to be saved out of those 250-odd babies, which all looked alike to me. This gave the wee green things another respite, but finally the day of uprooting came. The ground was strewn with feathery green, in spite of the passionate intensity which each little asparagus had developed in clinging to its job. If I had only known then what the next year's tragedy would be, and the next after that! With intense pride I regarded each enlarging clump; I felt that no one else had ever grown such asparagus in one season.

The second summer I began to have suspicions. The dark-green feathery plants were a joy to look at and a picture of dazzling beauty when covered with rain or dew, but the clumps were amazing in size, too amazing. I began to dig cautiously, then recklessly. Enormous roots were torn off ruthlessly. My worst fears were confirmed. My seedlings were busy strangling one another. All the finest seemed to grow right together, which meant endless sacrifices. How easy the tearing out of the small seedlings now appeared! To wrench out those splendid great plants was dreadful.

The following year it was worse. Most of my plants showed too many stalks of too many sizes, which meant interlocked crowns. Nearly all had to come up and be replanted. If I had only sent to a grower for plants how happy I should be, and yet—no, I should never have the personal affection for any professional asparagus plants

that I have for those personally conducted foster children that have cost me such hours of toil and regrets.

WASTING ENERGY ON BERRIES

After this report was written and printed we discovered a further cause for dismay. One of the two little books on asparagus growing we bought called our attention to the fact that female plants yield only half as many edible stalks as the male plants, because they use up their energy in forming countless berries full of little seeds. The seeds we bought must have been strongly inoculated with feminism, for considerably more than one-half of our plants were found to be of the fair sex, their graceful, feathery leaves being ornamented with millions of berries. Kind friends who were visiting us helped to pick off a bushel or two of these (to us) useless, aggravating things, but finally we gave it up in despair, deciding that all the females must be ruthlessly slaughtered.

This was easy enough so far as the old plants were concerned; but what were we to put in their places? It is not till the second summer, when the berries appear, that an asparagus plant betrays its sex. So we had to start a new bed of seedlings and wait patiently for certified plants of the male persuasion to put into the places of the massacred females.

To be sure, we might have bought one-year-old plants from the seedsmen, thus saving a

year; but we would not have known the sex of these yearlings, either, and half of them would have had to be pulled out again. The seedsmen also offer two-year-old and three-year-old plants; but none of the catalogues I have ever seen speaks of the sex of the plants offered for sale, although purchasers, if enlightened on this matter, would gladly pay a fancy price for guaranteed male plants. But wait a minute! Let us use our brains "real hard."

Buyers still further enlightened will absolutely refuse to order two-year- or three-year-old plants of either sex, for it is one of the most singular things about this very singular vegetable that, while it is easily transplanted at any age, the younger the plants are when transplanted the larger the crops will be in future years. This fact was established by a famous French specialist, M. Godefroid-Lebœuf, whose careful experiments showed that a plantation made with plants a year old produced double that of the one where two-year-old plants were used, and nearly treble that made with plants three years old!

So there you are! After all, it seems best to raise your own asparagus from seed, which method is more and more coming to the fore. If you are interested in all the details of asparagus culture you may get for a small sum a special booklet by Hexamer and another by Barnes and Robinson. But you will not need these if

you will carefully heed the information I am giving in this chapter. Allen French devotes twenty useful pages of his *Book of Vegetables* to asparagus, but he does not refer to the absolute necessity of exterminating all female plants. Unless that is done, no lasting success is possible. It is chiefly because they don't know that, that most farmers and commuters have no asparagus beds in their gardens.

For the most valuable advice we are indebted to Prof. J. C. Whitten of the Missouri Experiment Station. It was he who advised sowing liberally and discarding seven-eighths of the seedlings.

When the seedlings are three inches high [he says] select those which have the thickest, fleshiest, and most numerous stems, and pot them. They vary more than almost any other vegetable. Many that appear large and vigorous will have broad, flat, twisted, or corrugated stems. Discard them. Beware also of those that put out leaves close to the soil. These will all make tough, stringy, undesirable plants. The best plants are those which are cylindrical, smooth, and free from ridges. They shoot up rapidly and attain a height of two inches before leaves are put out. They look much like smooth needles. The matter of selecting the best plants for potting and subsequent planting out is of the greatest importance in asparagus culture.

Another extremely important hint, which alone is worth ten times the price of Hexamer's book, from which I have quoted the foregoing

paragraph, is that plants started in February in the greenhouse and transplanted to the garden in May "reach as good size in one year as the nursery-grown plants usually do in three years."

Few people, as I have said, have asparagus beds, chiefly, it is assumed, because it takes three years to get results. But there are other reasons. Some of these reasons the reader of these pages now knows. There are others still. Is it a wonder that so many asparagus beds, on which no one has bestowed his best brain power, are plowed down as useless at a time when they should be at their best? An asparagus bed, richly fed from year to year, should last at least a quarter of a century.

Is it a wonder that asparagus is expensive? Yet, so alluring is its flavor, so irresistible its appeal to the appetite, that people eagerly pay fancy prices for bunches of desiccated stalks that have been shipped three thousand miles and then left criminally exposed to the glare of the drying, juice-sucking sun several days longer by the stupid corner grocers. If such a bunch is worth fifty cents, then asparagus eaten an hour after it is cut, and retaining all its juices and ravishing flavor, is worth five dollars.

MAKES US HORRIBLY SELFISH

The only objection I can see to that kind of asparagus is that it makes the men and women who raise it horribly selfish. Even those who

gladly give of their other vegetables, or their fruits or berries, to esteemed neighbors, balk when it comes to asparagus. That's too good to share with others!

Surely, if you have room, and plenty of water for sprinkling, you will want to raise a vegetable so superlatively good that it destroys, in the best of us, the altruism which has been such a slow and wonderful product of civilization! Make up your mind to have an asparagus patch, and if, in starting it, you will bear in mind five things, you cannot fail:

1. Make the soil very rich at the start; and every spring, after you stop cutting the stalks for the table, dump a liberal supply of hen, sheep, or cow manure, besides wood ashes, bone meal, nitrate of soda, etc., on the surface. The rain or your automatic sprinkler will do the rest. Scrape or pull out weeds whenever they are an inch high, but do not hoe deeper than one inch. Spare the roots near the surface; there are millions of them.

2. Get your seeds from a reputable firm. There are many good varieties. Why not be patriotic and try the best American, which is Burbank's, besides the best French, known as Argenteuil, and Barr's Mammoth, which is the best English?

3. Plant the seeds at least six inches apart lest a shower wash two seeds so close together that you leave them as one, with strangling

results. Keep the ground moist, as the seeds are slow to germinate; soak them a day or two before sowing.

4. Now use your brains very hard. When the plants are about six inches high dig out with a trowel very carefully (lest you leave part of a crown in the ground) all those which have broad, flat, twisted, or corrugated stems, or put out leaves close to the soil. (If you have planted only the very choicest seeds you will probably find fewer of these bad plants than Professor Whitten did; at least, that has been my experience.) Throw away all these undesirable seedlings in a place where they cannot possibly grow. Then take out with your trowel still more carefully (so as to leave all the roots undisturbed, which is easiest just after they have been thoroughly watered) all the good plants except those which are three or four feet apart and can, therefore, be left permanently. Find deeply spaded and richly manured places for the good plants you take out with your trowel (if the plants are very luxuriant a small shovel is preferable), transplant them into these, and water at once. I believe that the reason why commercial one-year- and two-year-old roots yield less than seedlings that are left where they were sowed, is that when plants are sent by mail or express the thousands of tiny rootlets which are left behind in the discarded soil are never fully replaced. Transplanting

your own seedlings in the way I have just indicated obviates this disadvantage.

5. At least one-half of the plants you have thus transferred or left in permanent positions will prove during the second summer to be females, and will, therefore, have to be dug out as soon as they betray their sex. An infernal nuisance, you think, and right you are; but it is the only way to have a permanent asparagus bed that will not commit suicide by root strangling. Put certified male roots in the places of the ousted females and then your troubles will be over as long as your asparagus bed lasts, which may be thirty or forty years.

If you ask me what to do with the discarded female plants, I answer as the man did who, when away from home, got a telegram reading:

“Your mother-in-law has died. Shall we embalm, cremate, or bury her?”

He promptly wired back: “Embalm, cremate, *and* bury her. Take no chances.”

But hold on! Your troubles *may*, after all, not be over yet. Like all other plants (read the next chapter), the asparagus has insect and other enemies which you may have to fight. In fact, they may undo all your brain and brawn work and rout you as completely as if they were generated by a Foch.

Many an old bed has been destroyed by a fungus disease or blight known as rust. Frequent sprayings with Bordeaux mixture help

to keep it in check, but prevention is far better than cure. It has been found that the rust is most likely to occur in dry soil (and the best asparagus soil, being gravelly, easily gets too dry). Therefore, give your bed a good soaking at least twice a week in hot weather. Moreover, plants grown from your own seed and kept well fertilized will withstand the rust fungus much better than neglected plants—an additional reason for taking the best care of your asparagus patch.

There are also insect enemies, the commonest and most dreaded of which is known as the asparagus beetle. These beetles and their grubs injure the tender shoots which you want to eat yourself, and also strip the leaves off the plants. Arsenites or hellebore mixed with flour can be dusted on, except during the cutting season. Chickens eat the bugs and larvæ eagerly. If you have none to turn in, collect in your vegetable garden all the ladybirds you can find and put them on your asparagus plants. I shall have more to say about these adorable bugs in Chapter X, after telling in the following pages about some other garden pests which make gardening with brains a necessity.

CHAPTER IX. ON THE WAR-PATH IN THE GARDEN

ONCE upon a time a prize was offered at a social gathering for the most outrageous lie. It was awarded to the man who said, "There are no mosquitoes in New Jersey."

If I should say, "There were no Colorado beetles in my potato patch last year," every reader who has ever had a vegetable garden would cry out that I deserve the first prize. But it is practically true. In six long rows in two weeks I found no more than two dozen potato bugs! The preceding year, in the same number of days, I took over six hundred of these fellows off thirty hills that had been planted a little early to serve as decoys, and the total number of potato bugs we gathered in tomato cans and burned (yes, burned alive, and gleefully) amounted to several thousand.

It has been estimated that the killing of a single Colorado beetle before it has laid its eggs on the leaves saves the trouble of slaughtering a thousand of its progeny later on. A thousand times a thousand is a million, and we killed several thousand—that is, several potential millions! Against this rapacious enemy a potato plant has about as much chance as a lamb would have if it met a family of wolves in the forest. I can imagine no more gruesome sight in nature

than a neglected potato field, all the leaves devoured and nothing left but the bare stems. Were it not for the lucky fact that arsenic is as deadly to bugs as to human beings, the potato would have been extinct decades ago. A middle-aged woman told me that when she was a little girl her father used to give her a nickel for every *quart* of these beetles, so they must have been as abundant then as they are now.¹

ROSE BUGS AND GRAPE BLOSSOMS

Next to the potato beetles the rose bugs are perhaps the greatest of insect nuisances in the garden. With the possible exception of the hideous green worms which eat their way right through the lovely buds, they are the chief enemy of the rose. While no flower or leaf comes amiss, they seem to prefer fragrant blossoms, such as the gloriously colored and deliciously scented rose peonies. They are also specially fond of wild-grape blossoms, the scent of which is as voluptuous as that of the rose or peony. I shall never forget the thrills of delight that overpowered me one night in the Grand

¹ The habit of using separately Paris green to kill potato beetles and Bordeaux mixture to prevent blight is being superseded by spraying (or dusting, which is cheaper and easier), with liquids or powders which do both of these jobs at once. Begin early and keep it up late. "Most people do not spray late enough," writes Philip S. Rose in the *Country Gentleman*. "The last few weeks of growth make the big yields." He mentions one case where the yield was increased from 2,000 bushels to 3,700 by a late spraying; which, he adds, "looks like good pay for a few hours' work."

Cañon of Arizona, halfway down to the Colorado River, when our camp was surrounded by a tangle of wild grapes in full bloom.

A similar tangle surrounds a huge boulder (possibly deposited by a Mount Washington glacier a million years ago—*quien sabe?*) which is one of the chief ornaments of my present summer home. Its fragrance is at this moment wafted to the window at which I write. The rose bugs have always eaten its blossoms ravenously, and to this we have been attributing the fact that we never have any wild grapes for preserving as we did in such abundance on Mark Twain's estate in Redding, Connecticut (those which used to grow along the banks of the Androscoggin seem to have been winterkilled), but the experts of the nearest government experiment station inform me that I can expect no grapes from such a tangle of vines. Perhaps, they tell me, if we cut down the vines and started fresh we might get some grapes. But we prefer the abundance of fragrant blossoms even to wild-grape jelly; so that settles it.

If you are troubled by squash bugs exercise on them the Lucrezia Borgia fine art of mixing hellebore with flour and dusting it on the young plants. Strange what a passion all these pestilential creatures have for completely exterminating what they like best. A farmer once told me he had just replanted his cucumbers and pumpkins for the third time. He apparently

knew naught about hellebore, or pyrox, or other methods of making war on garden bugs.

HOSTS OF GARDEN HUNS

It is passing strange that every species of plants we value seems to have its private and particular enemy. Stranger still that this enemy always finds them, though they may be many miles from where the nearest plants they dote on have been raised before. I really believe that if a ship's captain planted chemically purified potatoes, rose bushes, or squash seeds on an uninhabited coral island, the Colorado, rose, and squash beetles would be on deck as soon as the plants were ready to be exterminated. Prussians couldn't beat them.

The number of garden Huns is startling. Corn alone has more than two hundred enemies, to many of which it would succumb did it not have as its ally an expert poisoner. What poisons to get for his crops, when and how to apply them—these are among the multitudinous things a gardener must know.

He must be a plant doctor, too. Plant diseases are as numerous as the sucking, cutting, devouring enemies. Nearly every agricultural college in the country has courses in plant pathology, but there are not enough graduates to constitute a separate profession, so the gardener has to do the best he can, just as he does in case of illness in the family if no doctor is nigh.

The government looks after the farmer, and in case of plant epidemic in the wheat field or orchard does what it can to check them. But the flower gardener usually has to shift for himself. A good beginning, however, has recently been made in his behalf. For example, when Mrs. Edward Harding three years ago brought out her delightful and gorgeously illustrated *de luxe* volume on peonies she added a chapter on their diseases—seven were known at that time, and Professor Whetzel of Ithaca was on the lookout for others and their cure; while Doctor Taubenhaus of Texas has devoted the greater part of his valuable book *The Culture and Diseases of the Sweet Pea*, to the diseases which have caused so much sorrow among disappointed lovers of this exquisitely fragrant favorite.

GRASSHOPPERS, WOODCHUCKS, CROWS, AND CATS

After all, ordinary plant enemies and diseases seem insignificant compared with such devastating hosts as the grasshoppers which gardeners and farmers are sometimes called upon to fight—flocks of insects which in a day or two eat up everything green in sight. One summer North Dakota spent \$600,000 on the warpath against grasshoppers. In Maine—at least in Oxford County—they are usually scarce—hardly enough to supply bait for fishing; but one summer we had a regular visitation of them.

I put hens in the garden; but instead of eating the hoppers they scratched out some of my best plants.

A number of times daily I chased them out of the garden with brush. My friends said I presented a funny sight in doing this, and no doubt they were right. What was particularly annoying was that these hoppers preferred the glorious blossoms of my imported Japanese iris plants to everything else in the garden! When I put cheesecloth around them they ate through it and got the blossoms all the same! The only way we could get our share of the iris flowers was by cutting the stems with the buds and letting them open in the house.

Perhaps I ought to have felt some professional sympathy with these floral epicures because of their good taste; but I didn't, any more than I have felt with cutworms, though they, too, eat only the daintiest young plants. With them and other garden visitors of their kind I must forever remain on a war footing. Let me name but two more of them, epicures both, the "cornivorous" crow and the festive woodchuck.

Thanks to Laddie, I have never had any trouble with woodchucks. One summer he killed fourteen, mostly with my aid, he on one side of the stone fence, I on the other, removing the stones one by one; or else digging them out of their tunnels, I with a spade, he with his paws. Less fortunate are gardeners who have

no dogs. Mrs. Julian Hawthorne once told me at Redding how she had invited her friends to share with her next day a delicious crop of young pod beans. During the night a woodchuck epicure ate them all up.

That crows are epicures they prove by pulling up the corn just after it has sprouted. Do they know what Chinese cooks knew long ago (while we have just found it out), that by sprouting grains before we eat them we greatly increase the amount of precious food salts in them? Maybe; but all the same I don't sympathize with crows. Once they dug up a whole row of my earliest Golden Bantam corn. I set a crow trap and caught—Silverheels! Toward morning I heard feline cries of distress. I got up and found our pet pussy in the trap, fortunately not badly hurt.

Gardeners really ought not to have cats, for birds eat thousands of injurious insect pests and a country cat devours two hundred birds a year! To be sure, cats also eat field mice and the very injurious moles.

Silverheels was more like a dog than like a cat. Nearly every day he accompanied us on our walk in the woods. He meowed woefully if we went too far; on the way home he was contentedly silent. He and the collie were great chums; Laddie even let pussy eat out of his plate. Both were epicures, too; when we were eating, they sat on their hind legs, eagerly

watching for titbits, which they preferred to anything we put on their plates. Epicurism was Silverheels's one great fault; no matter how many titbits and how much raw liver we gave him, he caught a bird for a dainty meal every day. He knew he was doing wrong; for after I had thrown my cap at him a few times he no longer brought the birds home, but ate them in the field. So it served him right to be caught in the crow trap.

Cats and dogs sometimes do a good deal of harm in the garden by rolling on borders or tearing them up. The editor of Black's *Gardening Dictionary* indicates two ways of dealing with them. One of them is to leave tempting pieces of meat, with cayenne pepper concealed in them, lying about; the other, to sink bottles in the border and put a little strong ammonia into them. Mice he would exterminate with traps; rats with some poison that is harmless to other animals; and moles by following the main run to the "earth" and digging them out. Poisoned worms, he thinks, are not much good.

CHAPTER X. LADYBIRDS, TOADS, AND CHICKENS

I HAVE just referred to Black's *Gardening Dictionary*, an excellent book of reference, published in London. It requires twenty-six pages to describe "insect pests" in the garden, while the "insect friends" are disposed of in three pages. The most beneficent of these friends is the ladybird.

The French call the ladybird *bête à bon Dieu*, and it certainly does seem as if this little beetle had been specially sent from heaven to protect and encourage gardeners and orchardists. I happened to be in California one winter when there were tremendous excitement and great joy among lemon and orange growers because a remedy had at last been found for the fluted scale, which threatened the extinction of the whole citrus industry in that state. Max Nebelung, my brother-in-law, took me out gleefully to let me see how the Australian ladybird (also called ladybug) was annihilating the pestiferous San José scale, which bears the appropriate name of *Aspidiotus perniciosus*. The trunks and branches of most of the family's trees (a few years ago \$100,000 was offered for this orchard) were completely covered with these minute sap-sucking insects, but hundreds of ladybugs were devouring them eagerly, and the best part of it was that they did not leave a single enemy on a tree when they flew to the next.

In our gardens several varieties of this darling beetle make themselves useful. The spotted ladybird is death on the asparagus beetle, which, if not checked, will destroy a whole bed of this delectable vegetable. These ladybirds are pretty creatures, rose colored, with black spots. I catch them in the vegetable garden by the handful and carry them to the asparagus, or sweet pea, or poppy beds, or wherever else they are most wanted. That the sweet peas need them badly sometimes may be gathered from the fact that a single green aphid of the kind which destroy the leaves of this plant may in one season become the progenitor of nearly half a million aphides. I hate particularly the black aphides which cluster around the stems of poppies. Arsenic kills them, but I don't want to spray my choice blossoms, so I rely on these beetles, and they do the job efficiently.

TOADS, YES—SNAKES, NO

Toads I also carry (in tin cans) to my favorite garden beds. To be sure, they may swallow the *bêtes à bon Dieu* along with beetles that come from the "other place," but that cannot be helped. Toadie must be fed even if we have to throw in a few of our best friends to fill his capacious maw. Snakes, on the other hand—who wants snakes in his garden? I kill them always. To be sure, they are insectivorous, but

they also swallow young toads—I have rescued some of them at the critical moment—so there you are! Everything we do in this world is both right and wrong.

Casuistry invades the garden, too. Shall we kill squirrels? They are such dear little things; so amusing to watch; but they destroy birds' eggs; and birds, after all, are more desirable, for they eat insects and they delight us with song—so there you are again. And when the birds eat your cherries or berries—but let us draw a curtain over this perplexing problem, except so far as it relates to the big birds we call crows and chickens.

Should gardeners kill the crows which destroy field mice, moles, and other pests? No and yes. A few days ago a young farmer told me how one year the crows were so abundant that they not only devastated the corn fields, but dug out and ate the potatoes just planted. They ate also the poisoned corn left for them in convenient little piles. Then they flew on trees and fell down dead. The skunks which ate them also died, whereat the trappers raised a howl. Curious concatenation: farmer, crow, corn, strychnine, skunk, trapper!

Shall chickens be allowed in the garden or orchard? In the orchard, yes, by all means. I once noticed on a farm that the trees in the part of an apple orchard open to the hens had a full crop of fruit every year, whereas the other

trees played the usual aggravating seesaw between too much one year and nothing at all the next. In 1920 New York had a bumper crop of apples, while Maine—at least this part of it—had only a bushel or two. Of our own trees the only ones bearing that autumn were the two which in the preceding fall got each a pailful of enrichment from the henhouse.

CHICKENS AND THE GARDEN

In gardens, too, chickens would be desirable if they would only behave themselves; but they don't. They would be welcome to all the grasshoppers they could catch and all the worms they could scratch; but when they eat young plants, or ripe tomatoes, or dig out precious plants in quest of insects, you gently but firmly drive them back to their inclosure. What I do with our flock of fifty is to let them out on the pasture for an hour daily; the grasshoppers and moths and other critters they swallow in that time are a valuable addition to the diet which we don't have to pay for.

If the chickens are of no use to the garden—except when all the damageable crops are in, after which they should be turned loose in it all day—the garden, on the other hand, is of great use to them. In speaking of pigs I refer to the now fully recognized importance of greens in their diet because of their growth-promoting food salts. Chickens, too, grow faster and are

better to eat if they get plenty of green fodder from the garden. Lettuce plants that refuse to head are punished by being pitched into the hen yard instead of our salad bowl. Lawn clippings, clovers, and all tender weeds are relished by them, but the best thing is a row of Swiss chard, because the huge outside leaves can be broken off frequently, being replaced in a few days by others. To make the chickens eat the maximum of greens I always throw the leaves in early in the morning, when they are ravenously hungry, and half an hour before their other meals.

Burbank has created a Rainbow variety which makes chard ornamental as well as useful.

It is really astonishing how the feed bill can be reduced by making the garden tributary to the chickens. The other day we had five broilers for ourselves and guests. I roughly figured out the cost to us of these five as about four dollars. At New York City prices for broilers it would have been twelve dollars. We have twenty hens which lay on the average three dollars' worth of eggs a week. That pays for the grain we have to buy for the whole flock of fifty chickens. Making allowance for this, our broilers cost even less than the sum I named.

As for hens, I have heard that they can be made entirely self-supporting by letting them eat their own eggs. I haven't tried this; it

seems stingy. Besides, we want the eggs ourselves, don't we?

The egg shells, however, they can have; and also give them crushed oyster shells. There is a current belief that if you throw them the shells the hens will learn to eat the eggs. I have never seen them do that; but I have seen them indulge in downright cannibalism. A poor little chick was hurt, and as soon as its companions saw the raw flesh they pounced on it and tore out chunks before I could stop them.

The chickens' appetite for meat, raw or cooked, is astonishing. If you want to see some fun throw them a chop bone. One chicken will seize it and run, the others following in hot pursuit. One after another will grab the bone, only to lose it in turn. Not being a football reporter, I shall not attempt to describe the tussle for that bone.

One September day, when we were summering in the Sunday River Valley, a hen which had secretly made its nest in the woods came home with seven little chicks. The owner of the farm was for destroying them, as it was too late to bring them up in this climate, but I begged her to let me see what I could do. Knowing their carnal appetite, I thought I could force their growth by an exclusive meat diet. Presently they all began to fight; "they fit all day and they fit all night," and the little feathers, which they needed so badly as the days and nights

grew cooler, were all torn out. I asked an old farmer about it.

"What do you feed them?" he asked.

"Nothing but meat," I replied.

"Drop it," he said, "and give them crushed grain."

I did so, and the war ended promptly.

Is this an argument for vegetarianism? If so, it might be well to incorporate vegetarianism among the commandments of the League of Nations.

A PROHIBITION ROOSTER

Some of the boarders that same summer hatched out an original plan for celebrating the Fourth of July. Fireworks we didn't care for, but wouldn't it be great fun to get the old rooster drunk? We imagined him strutting about and making as great a show of himself as any drunken man ever seen on the stage. There was nothing cruel about it. He might have a headache the next day, but who cares whether a rooster has a headache or not? He had to fast on the third day of the month and the next morning he eagerly ate several slices of bread soaked in whisky. Then we waited, waited, and waited. Nothing happened. Evidently that wasn't his idea of properly celebrating the glorious Fourth. We ought to have had sense enough to reflect that a Maine rooster wouldn't get drunk, because he knew he mustn't.

He was a red rooster—a Rhode Island red. In chickendom I confess I like the reds; they are good to eat, healthy, and not afraid of foxes or skunks. Like guinea hens and turkeys, they love to roam the woods, which makes them gamy. Their foraging habits make them literally self-supporting, not even a garden being needed. To make them sweet and tender for the table, however, it is well to imprison them the last two weeks of their short life and feed them corn, chard, and milk.

It is too bad that chickens *don't* behave themselves in a garden. They could do ever so much good by eating destructive bugs and worms; but their habit of scratching, scratching, scratching all day long (the little chicks begin to scratch the day they are hatched) makes chicken wire a necessity. I wish there was something as simple as chicken wire to prevent the damage by worms and by trees (often unsuspected) to which we must now give our attention.

CHAPTER XI. MORALS OF ELM TREES AND CUTWORMS

IN Oregon, where I was brought up, people used to hate trees, particularly the big ones. Why? Because their room was preferred to their company. There were a few large and astonishingly fertile regions, notably the Willamette, Rogue River, and Umpqua Valleys, ready for the plow and the hoe, but elsewhere, if a settler wanted a home he had to begin by making a "clearing"—that is, he had to chop down and burn giant trees and painfully dig out the stumps before tilth was possible.

Though an Oregonian, I never shared the general hatred of trees, possibly because I didn't have to dig out stumps. We lived in the Willamette Valley. We owned hundreds of the jumbo trees, but as we had plenty of arable land for garden and orchard we left them alone. Now, alas! they are all gone, turned into boards, planks, and shingles. It almost makes me weep to think of it.

While I have always admired and defended trees, I must say there are things about them I do not like. Their moral character is deplorable. In front of my window there are two stately elms of the finest New England stock, and three splendid maple trees, sweet, graceful, and umbrageous. To the eye nothing could be more beautiful, ingratiating, and altruistic; but beneath this fair exterior there is utter selfish-

ness and complete disregard of other people's property rights. Let me explain.

Some years ago I started out to raise pansies such as for size and beauty had never been equaled in Oxford County. I had two books and several leaflets, besides years of personal experience, to guide me. Nothing was left undone that would make the flowers large, brilliant, and fragrant; but I never had such a wretched lot of pansies in my life. They started out well, but gradually they became smaller until they were not much better than the pert and puny Johnny-jump-ups, the simian ancestors of the pansy.

Was I disgusted? Puzzled, too. I didn't wait for them to die, but dug them out at once—and what do you suppose I found? A colony of root-eating worms and bugs? Worse than that. The post-mortem revealed a ruthless conspiracy to ruin my flowers. A neighboring elm tree had sent one of its root branches into the center of my bed, and from there a million tiny rootlets radiated in all directions and greedily sucked up the rich plant food and the water I had provided for the pansies. Their tender roots had struggled in vain to hold their own against the *Boche* invader.

I am quite aware that an Eiffel Tower elm needs an enormous amount of mineral matter and water—tons of water daily, to be evaporated by its countless leaves—have you ever

tried to count them? It has been estimated that "the largest steam boiler in use, kept constantly boiling, could not evaporate more water than one large elm would in the same time." Granted. But does that excuse the elm for hogging it—having all four feet in the trough, so to speak—and taking away from my three hundred timid pansies every drop of water I toilsomely provided? I fear that, morally considered, elm trees are not much better than human beings and other monopolists. The doctrine of live and let live has not yet penetrated their bark. But I now know how to get even with them. I plant my pansies as near their shade as I darn please, but every few weeks I take the sod cutter and ply it along the four sides of the bed.

Revenge is sweet.

TRAGEDIES IN THE GARDEN

By contrast with witch grass, to be sure, the elm tree is almost a saint. It is known officially as Johnson grass because it was originally imported by a man named Johnson from Turkey—and it has all the moral qualities for which the Turks have been notorious for centuries. Nothing can withstand the propagandist progress of this grass. On and on it creeps in all directions, sending up fresh blades every few inches. Its business end is a sort of needle, so sharp that it can penetrate through an iris

bulb that stands in its way! I have seen it with my own eyes. In neglected gardens I have often seen flowering plants and vegetables pitilessly pierced, smothered, and strangled by this vegetable Turk.

Tragedies of this sort by the million are daily and nightly enacted over and under ground in our gardens. Every morning the first thing I do is to see what harm has been done by the cutworms. They are not so big as the "worm" Fafner, but they do a great deal of harm. Their *modus operandi* consists in cutting off a baby plant just where it comes out of the ground. The worm eats a part of the stem or leaf—its appetite is not big—but the plant is dead—its leaves lie prone; and that is your chance. They betray the presence of the culprit. Dig down an inch and you generally find him. If you don't he'll murder another plant before to-morrow morning. I have known a cut worm to bite through the big stem of a young tomato just transplanted.

MALICIOUS WORMS

All these things might be overlooked were it not for a diabolical trait which differentiates the cutworm from other burrowers. There are plenty of them—among them the yellow wire worm and the white grubs. But these eat the roots, and they eat them where the plants are abundant, the more the merrier. Not so with

the cutworm. He has some mysterious, malicious instinct which guides him infallibly to those spots in the garden where you least want him. I am not joking; it is an actual fact. Out of about one-hundred and forty precious romaine plants I transplanted the other day, forty-five have already been destroyed. Near by is a row of salad plants by the hundred, where forty-five wouldn't be missed; but not one of these has been hurt.

In another part of the garden there is a cucumber hill on which only two seeds came up, strange to say. One of these fell a victim to a cutworm this morning. (I got him!) The adjoining hill had twenty young squash plants. They, of course, were all right. There's safety in numbers. Can you imagine anything more cowardly than a cutworm? Let us draw the foot over him—over any worm, in fact, except the angleworm; he's harmless—in fact, he is useful; he shows us where the soil is rich; he helps to make it ready for use; Darwin was so struck by his beneficence that he wrote a book about him; he is good for fishing, and in Chinese restaurants he adorns certain varieties of chop suey. Why not? On Berlin menus I have seen the word *Maikäfersuppe*—soup made of what we call June bugs.

Cutworms might make themselves useful, and welcome, too, in the garden if they would help us thin out plants. I have a hundred-foot row

of bean plants, half of which will have to be pulled out. The worms have taken only one—just like them, though they love beans. No, the best thing to do with these fellows is to exterminate them. One way of making them harmless is illustrated in my sweet-pea row. On both sides of this I planted radish seeds thickly; these always come up in a few days and provide cheap food for the worm. I have lost only one sweet pea this year, and most of the radishes are left for our table.

Gophers are another variety of lower-world denizens that keep the gardener guessing where they'll turn up next. They create a tortuous upheaval somewhat resembling that of an earthquake, and a row of your favorite flower or vegetables is liable to be suddenly severed from its base and left with a tunnel underneath. Fortunately, we are seldom bothered by these burrowers; but my friend Luther Burbank was at one time so harassed by them that he abandoned his gladiolus colony for some years.

Have you seen the Burbank brand of gladioli? If not, you have something to live for. In one respect the gophers are like cutworms. As Burbank remarks, "the animals took special delight in attacking the choicest plants." He suffered a loss from these pests of "certainly not less than a thousand dollars year after year." All the usual traps were tried in vain, but finally the gopher gun was invented. It consists of a

trap so arranged that when the gopher pokes his nose against the trigger a charge of powder explodes beneath the animal, killing him instantly by concussion. With this device thirty-five to forty gophers were destroyed on his grounds daily, and finally he was able to resume the cultivation of the gladiolus.

STUDY THE ANATOMY OF ROOTS

If there were such a thing as a rural police department it might do a lot of good by capturing a number of gophers and wire and cut worms and subjecting them to the third degree. They could give us useful information about the anatomy of roots. This is a branch of horticulture which has been surprisingly neglected. All the garden books sing the praises of the hoe and dwell on the need of working it industriously to kill weeds, to let in fresh air which the roots need almost as much as the leaves do, and to create a dust mulch for keeping the moisture in the ground. But seldom is the man with the hoe or the plow warned that while he may be doing good in these ways he is likely to do more harm by destroying the roots of the precious plants.

Many a promising potato patch has been ruined by being injudiciously hoed or plowed by one ignorant of root anatomy. The American corn crop averages only twenty-six bushels per acre. This could easily be doubled and even

trebled (it often is) if the average farmer knew certain things—if he knew, for instance, that the one most important object of cultivating corn is the destruction of weeds, which is a superficial operation. The deeper plowing and hoeing so often practiced destroy millions of roots and rootlets, and thus do infinitely more harm than good.

In the *Country Gentleman* for April 5, 1919, L. F. Graber gave the following expert testimony on this point which every gardener and farmer should take to heart:

Thirty years ago Professor Morrow of the University of Illinois found that he could reduce the yields of corn seventeen bushels an acre by simply placing a frame twelve inches square over the hills and running a knife blade four inches deep round the outside. This was the first experiment showing the danger of root pruning from deep cultivation. The evidence gathered by numerous experiment stations since then in favor of shallow cultivation is so abundant and overwhelming that nothing more need be said, but considerable consternation among experimenters and corn growers was caused by the publication of a bulletin four years ago by the Illinois station giving data showing increased yields from *no cultivation at all*.

With an average of sixteen tests covering a period of eight years, it was found that killing weeds without cultivation—that is, by scraping them off with a sharp hoe—gave 17.1 per cent, or 6.7 bushels, more corn an acre than was possible with ordinary cultivation. At the outset these results appear astounding, but a study of the data reveals those very fundamental and basic

principles which underlie the most successful methods of corn cultivation.

Corn is a vigorous surface feeder. Three-quarters of the roots will be found in the plowed soil, and it is here that the plant gets its heavy requirements of fertilizing elements for rapid growth. Cultivate this surface soil three or four inches deep and you not only injure some of the corn roots, but you deprive them of about one-half of that rich feeding area which is available when weeds are killed without stirring the soil by just scraping with a hoe. Hence the 6.7 bushels increase. But how about conserving moisture? Is a loose surface mulch not necessary? In the subhumid or semiarid section cultivation to conserve moisture is an all-important matter; but under the humid climatic conditions of the Corn Belt the Illinois station found that little or no soil moisture escapes after the dense network of corn roots, radiating in all directions, becomes established.

In other words, the surface soil is of more value as a source of plant food than it is in saving moisture. This, of course, does not mean that it is practical to scrape the weeds out of our corn fields with a hoe, but it does mean, most emphatically, that corn should be cultivated deep enough to kill the weeds and no deeper. It means that we should cultivate shallow enough to reduce the root injury to a minimum, and shallow enough to provide the roots with as much surface soil as it is possible to give them for feeding purposes.

CHAPTER XII. DAILY MIRACLES IN THE GARDEN

IN delightful contrast to the shocking, grasping immorality of elm trees, laid bare in the preceding chapter, is the conduct of sorrel, the most unselfish of all plants. Many who have it in their gardens look on it as a weed and a nuisance—thus is true nobility of character oft misjudged. It is, in truth, a miracle of altruism.

See what it does! Like all other plants, it loves a rich soil, dotes on growing luxuriantly. But does it choose the rich spots in the garden, where it could vegetate profusely? Not a bit of it. Once in a while you see a morally degenerate specimen which forgets its manners and spreads its roots in a rich place intended for other, sweeter vegetables, but as a rule it exiles itself to the most arid corners of garden or pasture.

Why does it do this? Simply because it has got it into its head that its mission in life is to help gardeners. How? By informing them that the soil in which it has ascetically and acetically decided to grow is sour (birds of a feather flock together) and needs lime to sweeten it. "If wild sorrel grows freely about your garden you need lime," says the guidebook.

American gardeners, instead of being grateful to the sorrel for this information, mercilessly hoe it out. The French are more astute and appre-

ciative. In reward for the self-abnegation of the *oseille* they give it a rich place in the garden where it can be happy, and the best intensive cultivation. Then they eat it. Wouldn't *you* rather be eaten by epicures than just rudely hoed down?

In one respect the sorrel is like other plants. There are no old maids in the vegetable world. Every individual plant regards it as its moral duty to leave as many children as possible. I have sometimes thought that I would count all the seeds on a single wild mustard plant, but when I looked at it my courage oozed away. Life is short. Wild sorrel also produces seeds by the million; the tops of the plants paint whole fields a rich brown, so that any one who understands the language of flowers can read at a distance, "This soil needs lime."

THE INTELLIGENCE OF PLANTS

If you think plants have no intelligence, the ingenuity they display in the matter of having children must surely seem to you nothing short of miraculous. Take any one of a dozen weeds that might be named. If they begin life early in spring, when the soil is rich and moist from frequent showers, they spend lots of time in growing tall and sending out side branches covered with blossoms, laying their plans for progeny with old-fashioned patriarchal lavishness. But if they begin their career late in

summer or during a drought, the same plants that in spring would have indulged in Solomonic dreams of a thousand children content themselves with a dozen. While weeding I have often been struck and almost touched by the despairing, frantic efforts of a poor, mutilated plant to leave *something* behind, be it only a single seed. A plant lecturer on Malthusianism or birth control would be promptly hooted out of the garden by all the plants, weeds or no weeds.

Darwin, Wallace, Bates, Lubbock (don't fail to read his *Flowers, Fruits, and Leaves*), and other eminent naturalists have written on mimicry, on the many ingenious contrivances to secure the advantages of cross-fertilization by attracting insects, and on other astonishing manifestations of plant intelligence. Maeterlinck's charming little essay, *L'Intelligence des Fleurs*, presents some of these romantic facts in popular language. Have you ever read a book describing the thorns and the acrid juices and strong, disagreeable odors by which desert plants intelligently protect themselves against foraging animals?

Here in the desert, writes Burbank,

are plants which, although there may be not a drop of rain for a year, two years, or even ten, still contrive to get enough moisture out of the deep soil and out of the air to build up a structure which, by weight, is 92 per cent water—plants which contrive to absorb from

the scorching desert, and to protect from the withering sun, enough moisture to make them nearly as juicy as watermelons.

Here are the sagebrush, with a bitterness as irritant, almost, as the sting of a bee; the euphorbia, as poisonous as a snake; the cactus, as well armored as a porcupine—and for the same reasons that the bees have stings, that snakes have fangs, that porcupines have arrowlike spines—for self-protection from some stronger enemy which seeks to destroy.

One of Burbank's supreme achievements has been to pit his brains against the intelligence of these desert plants, to eliminate their hurtfulness and make them subservient to mankind. But let us return to the garden.

Gregory wrote a book on squashes in which he called attention to a trait of these plants which I have repeatedly tested. As they want always to look their best and dread being mutilated by the wind, they produce tendrils with which to cling to grass or anything available. If there is no grass and you put a stick in the ground, the vine will steer toward it. Then, when it has almost reached the stick, if you move it right or left, the vine changes its course and again makes a bee line for it. How does it do that? Darned if I know. It's one of the daily miracles in the garden.

Underground, the roots are led by a similar instinct (or whatever you choose to call it) to hunt around for manure and water. In quest of these things potato roots go down from three

and a half to four and a half feet, while corn roots have been known to bore for moisture to a depth of six feet.

Potatoes and corn and other garden vegetables know a lot more about their business than we do; but we are gradually learning, thanks to the recent study of root anatomy, which thoroughly condemns the vigorous hoeing and hilling that used to be fashionable and disastrous. Use your little fork and you will see that such plants as corn and potatoes have networks of horizontal roots in the topmost inch or two of the soil, which are destroyed by even moderately deep tillage. For an excellent account of the harm done by not letting intelligent plants grow as they want to, see Samuel Fraser's book, *The Potato*, pp. 11-16.

My corn and my potatoes are not touched by hoe or plow, except to remove the weeds. I wish you could see their luxuriant growth.

HOW PLANTS UTILIZE DEW

A few years ago I discovered an interesting fact that others, of course, must have noticed, though I have never read about it. Maine is a great region for dew; nearly every morning it is so heavy that I always wear my rubber boots till eight or nine o'clock. On the other hand, we don't usually get our just share of rain. There are showers, but you know how aggravating local and limited showers usually are.

If you don't know, and want to see it demonstrated graphically and geographically, spend a summer, as we did twice, at the hotel on top of Roan Mountain, in North Carolina. The landlord will show you, any day, in which county or township of which of the five states in sight the particular shower you see is going on.

One day (in Maine) there were showers all around us, on the mountains and in the valleys, but our garden got about seventeen drops. Next morning, nevertheless, the potato plants had little rings of moisture around their stems. The bright little things have learned how to circumvent drought by gathering the dew and growing a special set of rootlets near the surface to profit by it, if only for a few hours daily. Corn utilizes the dew the same way; so does lettuce; while the conical shape of the romaine plants seems to have been evolved especially for dew-catching purposes; it helps them flourish in midsummer.

I remember reading, some years ago, about an attempt made in some arid region to collect the dew by means of huge conical metal sheets. There are lots of things plants can teach us.

THE MOST MARVELOUS THING IN THE WORLD

Darwin called the tiny brain of the ant the most marvelous thing in the world, but Mark Twain showed by his amusing experiment in the Black Forest how grotesquely limited is the

ant's vaunted intelligence. To me the seed of a plant seems more marvelous in its way. Suppose you buy a mixed package of poppy seeds. Most of them are indistinguishable to the eye and much smaller than a pin's head; yet each of them grows infallibly into the same poppy it descended from, be it Iceland or Oriental or Darwin or Shirley or California, or what not. Not only that, but any changes or improvements made by plant breeders are promptly imbedded in the mysterious substance of the tiny seed.

Nothing I have ever said to or written about Luther Burbank in admiration of his achievements pleased him more than my noting at once that the Sunset Shirleys in his Santa Rosa garden were perceptibly more golden than the preceding summer's, and that I looked forward to enjoying the new shade in my Maine garden the following year.

In Burbank's garden, certainly, miracles are of daily occurrence. When he first began in California to "do stunts" with the plants, making them disregard the established order of things, a minister invited him to his church and then fiercely denounced him in his sermon as one who interfered with the laws of nature, as God alone had the right to do. But Burbank knew there was nothing impious in his new creations; that he was simply accelerating nature's processes of natural selection and improvement, doing in a decade what nature

unaided would have taken hundreds or thousands of years to achieve.

So he went his way quietly, putting new colors or fragrance into flowers, taking pits out of plums, removing the thorns from blackberry vines and cactus leaves, making nut trees bear in less than two years instead of in ten or fifteen, removing the acrid and indigestible tannin from the walnut, creating entirely new fruits and berries, such as the phenomenal and primus and the plumcot, and putting more luscious flavors into old ones, growing some five hundred varieties of cherries on one tree, and a hundred other things for the delectation of mankind.

Burbank is a great believer in the intelligence of plants; he knows that if you give them a chance they'll perform what to our limited intelligence seems like miracles. Some years ago he suggested that a motion picture be taken condensing half a month of the growth of a sweet-pea vine into an eight-minute reel, which would show us the vine wriggling and writhing and squirming, waving its tendrils around in the air, feeling out every inch for some support, and altogether displaying "an inherited intelligence which would be surprising even in an animal."

Concerning the remarkable intelligence of potatoes, a word will be said in the chapter on Burbank. It would be unjust, however, to put too much emphasis on the intelligence of proletarian plants. It might give them mis-

chievous ideas of superiority. I know men and women who are even more intelligent than Burbank potatoes. Of course they have gardens, and from their gardens they have learned a great deal; among other things, gardening has taught them how to be happy at all times, rain or shine. This point is so very important that a whole chapter must be devoted to it.

CHAPTER XIII. HOW TO BE HAPPY, RAIN OR SHINE

IF you want to be happy on a rainy day, have a garden and take care of it yourself. Soon you will learn to know the flowers and the best of the vegetables as personal friends to whom you might give names if there were not so many of them. I once read a story about a Spanish peasant who made pets of his squashes; he nursed and fed them as a loving mother cares for her children; he had names for all of them, and he dreaded the day when they would be ready for the market; but sell them he had to, because he needed the money.

On the day before he intended to go to market he found them all gone. He suspected who the thief was and, going to the market, soon found and claimed the squashes. The vender indignantly denied the charge and called a policeman to settle the case. The officer simply smiled when the peasant called his pets by name, but when he produced the ends of the vines and showed how they fitted exactly and individually into the vine ends of the squashes, he got them back and the thief was punished.

That peasant, no doubt, was happy every time it rained, because he knew that his squashes were enjoying the shower. If you have plants of your own, you too will come to sympathize with all their joys and sorrows. It will give you

a pang to see them drooping in a drought, but when the rain comes at last (in New York it usually comes at last every day) you will feel an altruistic elation that will make the day one of cheer instead of depression of spirits. The fine, sunny days you will, of course, enjoy for your own sake as well as the garden's; wherefore you will *always* be happy, rain or shine. How is that for a philosophy of life?

THE ART OF TRANSPLANTING

I am superlatively happy to-day because it rains dismally. It rained dismally all yesterday and last night; but it is the first rain in a month and the garden needed it desperately. The time had come, too, for transplanting, and you cannot transplant successfully on scorching, sunny days unless you put a circus tent over your garden. I got up at five o'clock, put on my rubber suit, which makes me as amphibious as a frog, and carried down a box of young Trianon plants.

What's a Trianon plant? You really don't know? Why, it's a variety of romaine, or cos (lettuce), self-folding, so you don't have to tie it up to bleach it. I enjoyed it first in the Paris restaurants, where the epicures prefer it to the finest head lettuce. Lean and green specimens of it are often in our own markets, but for the snow-white Parisian sorts you pay fifty cents a head over here. *You* do, I say—that is, if you

are an epicure. I don't, even though I confess to being an epicure of the super sort. I raise them by the row for almost nothing, and when the time comes we daily pull out half a dozen solid heads and eat them—that is, in part.

You may have heard of the seals along the Pacific coast which bite out of a big salmon one choice mouthful and then pass on to the next fish. We do something like that with our romaine, eating only the hearts—crisp, succulent, tasty, so full of vitamins or mineral salts that they hardly need the French dressing, though of course we use it. We are wasteful, I admit; but so are the seals; and at any rate we are not cruel. If anybody wants the outside leaves of our Trianon (we have other sorts of cos, too, as well as ordinary lettuce), send us stamped and addressed parcel-post wrappers and we'll mail them.¹

The rain was not the only thing that made me happy this morning. I enjoyed transplanting the Trianons (and a box of Burbank's new Rainbow chard) because I know how to do that sort of thing well—we usually love our work in proportion to our skill in doing it. I had started these and some lettuce plants in boxes, because earliness is of the utmost importance. Even Iceberg, Brittle Ice, Deacon, and New

¹ Some kinds of romaine are not self-heading—in unfavorable dry seasons most of them need to be tied near the top with soft string or raffia to blanch the inside leaves.

York, which (with Dreer's Wonderful, which is well named) are the best varieties of lettuce for summer growing, are apt to go to seed without heading if their heading time comes too late in summer.

Maine is kinder to these frigid plants than Massachusetts or states farther south; more than once a market gardener from near Boston who specializes in lettuce has envied me the cold nights here and admired my achievements; yet an occasional summer's prolonged heat and drought are deadly to most of the salad plants, even up here in the North.

In Connecticut they provide summer shade for weeds—at any rate, for the weed *par excellence*. If tobacco is thus coddled, why shouldn't I try the same method with my greens? The price of cheesecloth has doubled or trebled, like everything else, but even thus it is vastly cheaper than buying Trianons or Icebergs at half a dollar a head. Old burlap sacks, supported on shingles, are as good as cheesecloth.

EFFECTIVE CROP INSURANCE

In some parts of Europe, particularly the Bavarian highlands, hailstorms are so frequent and so destructive that most of the gardeners and farmers take out a special hail insurance on their crops. I do not know if one could get a general insurance on garden crops against drought, plant diseases, frost, and other calami-

ties, nor would I personally care to take out such an insurance. I might have got some compensation money in 1920 because most of my salad plants went to seed instead of heading; or because some of our potatoes, delayed by the lack of rain, did not ripen before frost; or because the same exceptional lack of rain (for seven weeks) made my corn average only one ear to a stalk instead of two; but money wasn't what I wanted and worked for. It was the extra-fancy vegetables that I wanted; those you cannot buy.

Farmers seldom raise them, because they think they haven't time for intensive gardening. It is usually pitiable to see their gardens, when they do have any: a row of ordinary lettuce, too crowded to be able to head; a row of equally overcrowded cucumbers; and enough peas and beans and sweet corn to last a week or two—that's the usual thing. The rest of the year they eat canned vegetables or none at all.

Contrast that with my garden. In spite of seven weeks' drought, we had seven weeks of sweet corn and five or six of luscious peas, with enough left over (as well as of beans, carrots, and beets) for preserving in jars, some of which we took to New York, while the rest up here lasted us till harvest time came again. Intensive gardening did it—*it was a sort of insurance*—crop insurance—far better than commercial insurance, because

it insures the thing you want—vegetables and not money—unless, of course, you do truck gardening for a living, which alters the case.

It was because I practiced the methods of intensive gardening that I was insured the worst year for gardening (in Maine) I have ever known. In putting in the Bantam corn, for instance, I dug for each hill a hole a foot deep and wide, in which I mixed a little pulverized sheep manure and bone meal (wood ashes do not seem to help corn) with the (previously manured) soil. Then, with my finger, I made seven little holes for seven kernels of corn which had soaked in water overnight. Then I dug down with my trowel for some moist soil and put it over the kernels, after which, with my foot or the flat end of the hoe I firmed the soil. Then I wet the "hill" thoroughly (usually it is called a hill, though hilling is no longer practiced by up-to-date corn growers) and finally I hoed an inch of dry soil over the whole to form a dust mulch to keep in the moisture. As all of the seven kernels sprouted, three were pulled out when they were six inches high, the strongest being left.

MAKE INTENSIVE GARDENING COMPULSORY!

It was slow work, no doubt—but I got my corn; I was insured against total loss. In a favorable season most of my painstaking work would have been superfluous; but don't you

insure your house, though you feel sure it won't burn up? That season there were few families in this neighborhood whose corn didn't literally burn up from the sun's heat. It was pitiable to see it curl up its leaves (plants know a thing or two) so as to have less surface exposed to the desiccating sun, unfurling again when the grateful coolness of the night and its dew came.

If that summer was the least favorable for gardening I have ever known, I remember one summer in this neighborhood which was simply ideal—no scorching heat, and rain regularly whenever it was needed. There was only one thing to mar my happiness—I had bought a fine new hose and had no use for it whatever!

In transplanting my Trianons and Icebergs and Burbank chards I, of course, put them in according to the intensive method, which ought to be enforced on all gardeners by a new amendment to the Constitution. That means scooping out a hole with the trowel for each plant and enriching the soil with a little dried hen or sheep manure, with some crumbled cow manure or a leaf mold below to make a cool summer bed for the lowest roots. Of course the plants had been started in the box in soil which adhered to them tightly when wet. A naked root is hard to transplant. Imagine my indignation one day on Barelay Street, New York, when I saw a salesman deliberately shake off all the soil

from a dozen tomato plants he was selling to a green suburbanite!

Naked roots *can* be made to grow if the soil above is firmly pressed down on them and then liberally watered and the plant shaded with shingles for a few days. Or you might hold a parasol over it a day or two.

The notion that lettuce and romaine seedlings *must* be transplanted if you want them to head is incorrect. If you start your seeds very early in a box or cold frame they must, of course, be set out; but usually I have had more success in my head-hunting expeditions if the seeds were planted as early as the soil can be spaded into a rich and easily watered spot where they can be left. Volunteer plants—that is, self-sown plants—are most likely of all to head. Transplanting, no matter how carefully done, is likely to delay heading a week or longer, and in raising vegetables of all kinds we don't want any speed limit. If you don't believe this, read the next chapter and be convinced.

CHAPTER XIV. A NEW TIME-TABLE FOR VEGETABLES

IN California I once heard an extraordinary story about a Burbank watermelon. One spring morning a man planted some seeds in his ranch and then worked on another part of it. When he got home in the evening he found that the vine had got ahead of him and deposited a ripe melon on his doorstep. The ranch was a quarter of a mile from his house. One version of the story says half a mile, but that's absurd.

I am convinced that Mark Twain wasn't entirely in his right mind when he wrote an article for an agricultural paper (of which he was temporary editor) in which he said that "turnips should never be pulled; it injures them. It is much better to send a boy up and let him shake the tree."

Mark Twain was certainly an ass. He didn't know the first rudiments of horticulture. He also wrote that "the guano is a fine bird, but great care is necessary in rearing it"; that farmers should plant their buckwheat cakes in July instead of August; and that "the pumpkin as a shade tree is a failure." Holy Moses! Can you beat it?

Evidently all these things came to the fore in my brain the other night when I had a singular dream which made me supremely happy. I

am particularly fond of cantaloupes, but can't raise them up here because, as I have said before, the nights are too cold and the season is too short. Well, I dreamed that I was going to have for breakfast ripe melons raised in my garden from seed in three weeks. How did I do it, when the time-table says three months? By crossing the coy and dilatory cantaloupe with the forward and prolific cucumber, and then hybridizing the new vine with the radish, which is ready to eat in three weeks after the seed is put in the ground. I had read in Burbank's books that almost anything can be done in the way of training and intermarrying vegetables, keeping the good qualities of each while eliminating the bad ones; and my experiment didn't, in my dream, seem much more impossible than his trick of "growing potatoes on tomato-vines." But when I looked up his seventh volume, which is concerned with the higher education of vegetables, I found that, in his experience, the cucumber "refuses to hybridize with other melons"; and thus my scheme was shattered.

I am now considering the possibility of grafting melon vines on witch-grass roots, which seem to travel at the approximate rate of a yard a day while sending up fresh roots every three inches. When that is accomplished I should like to see anyone get ahead of me in the melon market. There's millions in it.

STOP THE LOAFING

To quit fooling, it is evident that it would be a great thing if the time for the growing and ripening of melons, and all other vegetables, could be halved and quartered and eighthed. The quicker a vegetable grows the more tender and succulent it is for the table. Plenty of manure and water will do wonders, as the Paris market gardeners in particular have shown, and astonishing accelerations are also due to the intelligent and frequent use of some chemical fertilizers, notably nitrate of soda—or, more rapid still, nitrate of ammonia, the fastest of all fertilizers (if you are so lucky as to get a pure sample); but that is not enough. The whole time-table of vegetable growth in the garden is outmoded and should be smashed to smithereens.

Why should carrots and beets and cabbage and lettuce and all the rest of the kitchen plants loaf around from two to three months, exposed to all the dangers of drought and frost and disease and blight and insect pests, before they are ripe for the table? It's simply absurd. The government has dozens of expensive experimental stations for mending such matters, but for the most part the officials seem to be as much given to loafing as the lazy plants. Get a move on yourselves, gentlemen, and on the vegetables! That's my advice.

On another page I have referred to the Aus-

tralian and American benefactors who have evolved a new race of sweet peas which come into bloom five or six weeks sooner than the older sorts, without being inferior in beauty. Why shouldn't the same methods and pains applied to the edible peas do the same thing for them? Why allow them to vegetate and lounge and dilly-dally till the July or August sun broils their tender roots to tinder? It is easy to breed a faster race by selecting, year after year, those of the pods which ripen first, and planting those exclusively.

In quality (tenderness and flavor) our garden peas leave little to be desired. The only thing to regret is that the very best of them all bears the name "Senator," for sarcasm is out of place in the garden. Much as I relish the Senators (the peas, I mean), I hope to see them dethroned by the marvelous variety known as Quite Content. These are ahead of any French *petits pois* I have ever eaten, and they are the opposite of *petits*. Taller than any other peas grown (you need chicken wire to support them), the pods and the peas in them are much larger than any others, yet they are tender and luscious.

UNSTRINGING THE BEANS

While American peas seem to me superior in flavor to the European (I once asked a London waiter why the peas had been flavored with mint, and he answered, "Peas 'ave no flavor,

sir”), our beans leave a good deal to be desired in rapidity of growth and otherwise. Every year I plant some new variety, but always feel I must “try, try again.” The Parisians have a kind which is very much more tasty. It is an insignificant-looking thing, small and “rusty,” but, oh, the flavor! When David Burpee wrote me, in 1920, he was going to Europe, I implored him to import this variety and make it popular over here, just as his father, W. Atlee Burpee, did the insignificant-looking Golden Bantam corn.

Burpee also introduced the stringless pod bean, America’s great contribution to beandom. Its originator was a man whose name—Calvin N. Keeney—is dear to all epicures, because he eliminated from the beans the bothersome strings which always got between the teeth—unless the cook had patiently removed them, which she often failed to do. The process of removing the strings from the different varieties of beans (there are hundreds of them) is still going on; don’t, for mercy’s sake, grow any but the stringless in your garden. Some of them are now in all seed catalogues, while the most advanced list chiefly the stringless. The world do move!

With three of our most important vegetables—corn, tomatoes, and potatoes—the plant breeders have been busy in recent years in reducing the time needed for growth and ripening. Except in the South, it is not customary to sow

the seeds of tomatoes in the garden; to get the ripe fruit in reasonable time it is necessary to start the plants in a greenhouse and transplant them when frost no longer threatens. The ripening can be further accelerated by training the plants to stakes and removing all side branches; but this is not enough. In our Northern states it is folly to plant any but the earliest of the varieties. Earliana is favored by market gardeners, but for the home garden Chalk's Jewel or Baer are better because the tomatoes do not all ripen at once. Earlier still than these—often by several weeks—is the Burbank tomato, which I have found the most satisfactory in my garden for earliness and quality. I can indorse the verdict of a Long Island enthusiast: "Most perfect in shape and color, the least vine, the most fruit, the longest in bearing, the least acid, the sweetest tomato." It would be impossible in Maine to do what has been done with the Burbank tomato in California—grow, from seeds ripened in June, a second crop the same summer! But I have planted Burbank seeds in the garden in June and picked ripe tomatoes from the vines, although the frostless season in this state is only three months. That, I fancy, is a "record."

THREE WEEKS' POTATOES

With the famous Burbank potato I have been less successful. The plants grow here with

tropical luxuriance, and the elongated and beautiful potatoes attain a large size, but they do not quite ripen before frost. After several trials I wrote to Mr. Burbank about an earlier variety with his trade-mark, telling him also I hadn't been very successful with his Iceland cucumbers. He replied: "Cucumbers and melons like a great amount of water and a great amount of *ammoniacal manure*. Then they will do simply wonders. There is no Early Burbank potato. The Early Rose is about the sweetest and most satisfactory early potato, but it is not a very heavy yielder."

The Early Rose was the ancestor of the Burbank, which, while evidently not the best for a mountainous region, is *the* potato for the Pacific coast (see an interesting list of favorites of various states in Samuel Fraser's book on the potato). Salzer's Six Weeks does not ripen in half the usual time, but it is surprisingly early and of the finest quality. It pays to buy pedigreed seed.

Inasmuch as the growing time of the potato in the garden can also be reduced by a fortnight or more by starting the tubers in the house, a Six Weeks variety ought to be reducible to the radish standard by three weeks from planting to the table; so, after all, my dream about the three-week melons may have had prophetic significance!

Corn, too, can be accelerated by starting it in

the house. Burbank relates (Vol. VIII, p. 29) how he did it and made profits which enabled him to, fortunately, make his home in California.¹

Two or three weeks can easily be saved this way. But such gains count for less than the breeding of new early varieties. The Golden Bantam owes its standing as the favorite of all sweet corns to its delicious flavor. But its earliness also has been an asset; and this earliness it owes largely to its not wasting time in growing seven-foot stalks. "The ear's the thing!" is its motto, and thus it has started a new era.

But it is time to return to the flower garden. I am so eager to have all my readers share the pleasures I have derived from my poppy, sweet pea, and pansy beds, in particular, that I will give a whole chapter to each of them.

¹ A writer in *Good Housekeeping* relates this: "We put some seed in wet sawdust in a shallow dish and placed it over the kitchen range. The seed sprouted vigorously. When the tops were three inches or so in height we set the plants out in the ground. . . . Not a single plant died of the one hundred we handled this way, and we had a fine stand of corn."

CHAPTER XV. AN OPIUM DREAM OF NEW POPPIES

ONCE upon a time I entered one of the large seed stores on Barclay Street, New York, at a moment when all the clerks (or should I say sales persons?) happened to be busy. So I listened to what one of them, a very pretty girl, was saying to a man who asked her about adding some poppy seeds to his list. She advised him not to do so, because it wasn't worth while. "The wind," she said, "always destroys the flowers in a short time."

This was too much for a poppy enthusiast and specialist like myself, who believes that if there are three kinds of flowers that absolutely *must* be in every garden poppies are one of them, the other two being sweet peas and pansies. With an apology to the pretty girl, I informed the man that I was an old gardener and that I could give him the names of poppies that survived even the rude winds of the White Mountains. He, of course, thanked me politely and asked me the names of those varieties? He did nothing of the sort. He simply stared at me superciliously (perhaps he did not wish to embarrass the girl) and said not a word; nor did he buy any poppy seeds, foolish man! One thing he did for me, though—he taught me for all time to mind my own business.

To-day it is my business to talk about the pop-

pies which flourish so luxuriantly even in this blustering mountainous region. I admit that a boisterous wind does sometimes mar the day's blossoms, but to give up poppies entirely for that reason would be about as sensible as giving up raising cherries because sometimes they are injured by excessive rain. It would, in fact, be much worse, because, while the cherries are ruined for the season, there is a new crop of poppies every day.

Of the many varieties of poppies offered by the seedsmen I admire and recommend particularly seven: the Iceland, Oriental, Darwin, Opium, Shirley, California, and Silver Lining. The first of them to bloom in spring is the Iceland, which, started in the late summer of the preceding year, greets us when we arrive in May, and with a little attention now and then blooms all summer, gracefully holding up its yellow, orange, and white blossoms on long stems. Some of the recent hybrids—pale yellow outside, pale flesh inside—are particularly engaging; so are the buds, covered with soft black fur. I shall never forget the sight of the long rows of Iceland poppies in front of the hotel at Lake Louise in the Canadian Rockies, where they seemed very much at home and happy. Though of the North, they do not shun the sun.

ORIENTAL, DARWIN, AND SILVER LINING

Giants among the poppy blossoms are the Orientals, which also bloom early in spring, and

the Opium; Burbank has had Orientals at Sebastopol with blossoms measuring almost a foot across; but even when much smaller they daze the color sense with a cardinal so bright as to be vibrant to the eye. The passion for varied and improved forms and colors has, of course, not passed by these poppies, which may now be admired in crimson, scarlet, yellowish, apricot pink, and dull white. The Oriental poppy is a perennial and almost indestructible. Those who don't know its habits are sometimes dismayed to find all traces of the plants gone in midsummer; but in the autumn they come up again fresh and smiling. Unlike other poppies, they transplant easily.

Of the Opium poppies the finest is the unfringed, snow-white variety. Burpee has it. It is divinely tall, holding up, a foot or more above other poppies, its enormous cup—it might be the Cup of the Holy Grail. The opium exudes from the seed capsules. But if you smoke it you could hardly dream of more marvelous new poppies than I am writing about.

I have often wondered why Dreer is apparently the only seedsman who offers the Darwin, one of the most dazzlingly beautiful of all poppies, as noteworthy and unique as the popular Darwin tulips. It has a rich, satiny texture; some of the flowers have petals of a rich, reddish, plum color, or heliotrope, sometimes shading into lighter bands on the edge;

others, even more lovely, are crimson (or royal purple) with dark plum-colored centers. The ring of grayish-green pollen adds much to their beauty. These poppies should be more widely known. Mine were suddenly struck by blight last year, but spraying with pyrox saved them.

The hideous name *Eschscholtzia*, given to the exquisite California poppy, excites my wrath almost as much as the name Rainier, still bestowed on our glorious Mount Tacoma. Rainier was an enemy admiral who fought the forces of George Washington, and for this sublime act we still honor him by giving his name to our sublimest snow peak, with the connivance of that ludicrous and entirely superfluous body, the Society of Geographic Names in Washington city, although both branches of the Legislature in Washington state, where this mountain is located—the old Indian name is Tacoma, or Tahoma—by a large majority begged that society to give up the name Rainier, which, under the circumstances, is worse than a joke. Equally maltreated is the California poppy. Eschscholtz was the surgeon of a Russian ship which explored the Western coast in 1815.

It is high time for California to find a more musical and appropriate name for its state flower, especially now that Luther Burbank has transformed some of these golden cups, which adorn the foothills by the billions in spring, into

crimson, white, and fiery-red blossoms of rare charm to garden epicures. How he did it is no secret; nature might, or might not, have done in ten thousand years what he did in ten. Starting with freaks, or sports—that is, golden poppies that accidentally had a white or red line—he enlarged those streaks by selection, each generation having a little more white or red, until the yellow was eliminated entirely.

No less remarkable and enchanting is another of Burbank's creations—an absolutely new thing under the sun—the Silver Lining poppy. Like many other novelties, it is not in Burbank's own seed catalogue because he sold it to Burpee, who thus felicitously describes it: "single flowers; rich scarlet, spotted with black; each spot appears to be covered with a *shield of white tissue paper*; altogether unique." Note also the soft, dull-green tint of the black spot under the shield.

In his Vol. IX, p. 123, Burbank tells how he developed this Silver Lining from an accidental white line in one flower between the black center and the crimson petal. While this striking curiosity is not as widely known as it should be, Burbank's most glorious creation in the poppy field is, fortunately, to be seen in many thousands of gardens—the improved Shirley. He was not the first to educate this poppy. He himself relates, in the volume just referred to (pp. 107–120), how an English clergyman,

the Rev. W. Wilks, discovered in 1880 a common red field, or corn, poppy which had a narrow edge of white. This he developed by selection till he had a white poppy, eliminating also the black central portion. Like everybody else, Burbank admired this novelty—so much so that he undertook to make the flowers larger, more beautiful in shape, finer in texture, and much more varied and delicate in color. He chose the flowers that showed the lighter shades of scarlet, crimson, pink, and white.

After years of experimenting on a large scale, with the aid of five assistants, he produced, among others, a strain of Shirleys of salmon or deep yellowish-pink color, which were introduced as the "Sunset Shades." More remarkable was the Celeste, which, seen in mass, presented the aspect of uniform blueness. This was nothing short of a creation—a miracle; nobody, before Mr. Burbank launched this flower, had ever seen a blue poppy. He developed it from a "sport," a flower in which he detected, underlying the normal color, a smokiness suggestive of a half-concealed blue pigmentation.¹

BURBANK'S ART SHIRLEYS

The Shirley bed on our lawn, three feet wide and twenty feet long, had this morning more

¹ Burbank no longer offers the blue Shirley separately, but Dreer now has it. I found it, in 1921, lovelier, larger, and deeper in color than ever. Don't fail to get it!

than three hundred large blossoms of bewildering beauty and astonishing variety and blending of tints. The seeds I got, of course, from Mr. Burbank himself. They embody all the latest improvements: flowers thin as tissue paper, yet of firm texture, and artistically waved and crinkled, in strong contrast with the smooth petals of the original English Shirleys. They are the perfected Shirley poppies and Art poppies of Burbank's seed book.

Silk crêpe seems like common calico in comparison with these delicate poppy petals. In showing my Shirley bed to girls I often ask: "How would you like to have a ball dress made of these? Which color, please—and how many yards?"

My wife has briefly sketched for me a few of the varieties: "Cup, flame color, yellow pollen; white, overlaid with fine veins of pale flame color; white, with deep flame edge; white, with rose edge; pale rose; deep rose; clear white, yellow pollen; white, with faintest line of purplish pink on the edge; white, veined heavily with deep purple, grass-green pollen; scarlet outer petals, deep pink inner ones; deep coral pink; scarlet, edged with white, with black spots; a Maltese cross edged with white, olive-green pollen; clear shell pink; deep cardinal, black spots; white, with center streaked with pale pink, brown anthers, yellow pollen; white, with deep heliotrope cross, green pollen; clear white, green

pollen; flesh-colored petal, sometimes edged with deeper shade, with four brownish-gray spots, setting off buttercup-yellow pollen." There are many others.

HOW TO RAISE FAIRY POPPIES

The Japanese have their flower gardens back of the house, where no one but themselves can enjoy them. I prefer the American way. My poppy bed is on the lawn in front of the house, where everyone from the road can see it. It makes me happy to see automobiles slow up and hear cries of: "Oh, look! See those flowers!" I may add that this bed includes, besides twenty feet of Shirleys, rows of other poppies of the Big Seven; also some double poppies. The Shrimp-pink Mikado and Fordhook Fairies are as fine as peonies or chrysanthemums, but double Shirleys or Darwins are not to be tolerated any more than double pansies or sweet peas.

My success with these delicate poppies in the rude mountain climate of this part of Maine shows that they are suitable for all regions. Of course, we cannot expect them to get along with as little care as on the Pacific coast. In Oregon, one summer, I sowed a number of Shirleys in my oldest sister's garden. When they had gone by I gathered the capsules and scattered the seeds over her lawn. To my surprise, she wrote me the following spring that these seeds had germi-

nated and given her a splendid crop of Burbanks!

In Maine that sort of thing is not to be expected; a poppy bed like mine means a lot of trouble—which it repays a hundredfold. I spade the ground nearly two feet deep, enrich it with old stable manure or leaf mold and a good general fertilizer plus wood ashes. When the ground has been firmed I scatter the seeds, sift on a little soil, firm again, put over it burlap sacks, and water through them till the plants are up. If the weather is dry the babes, after the sacks are removed (don't leave them on a minute too long) must have water once daily—sometimes twice. Thin out mercilessly, at first two inches apart, then to five or six or more.

You may have heard of the man who said his family of five lived in one room, which would be all right if his wife didn't insist on taking in lodgers. Don't crowd your plants like that or you won't have any poppies worth looking at. And two more very important points: In most gardens poppies last only two or three weeks. I make mine last six or seven weeks (though toward the end they get smaller) by rejuvenating the soil once a week, after they begin to blossom, with liquid fertilizer after a rain or a thorough soaking with the hose. By following this method Mrs. Theodore Thomas once counted 150 successive blossoms on one of her plants! Finally, don't let a single blossom go to seed.

Every other evening cut all the blossoms that begin to fade and you will be rewarded in the morning with a few hundred more of the ravishing beauties. It seems like a dream.

P.S.—If you haven't time to go to all the trouble indicated in the foregoing, have some of Burbanks's Art Shirleys (which you can get only from him), anyhow. Scatter the seeds anywhere, and be sure to have them in your mixed bed. They give me so much pleasure that I have three successive sowings every summer. Picked very early in the morning, they make ravishing bouquets for the house which will last several days if you stick an inch of the stems in boiling water for half a minute immediately after picking.

CHAPTER XVI. TWO THOUSAND ACRES OF SWEET PEAS

ANOTHER opium dream of fairyland, or can you, when awake, *imagine* it—two thousand acres of voluptuous fragrance exhaled by millions of sweet peas of every conceivable hue? Perhaps you can if you ever have had the good luck to be in the Riviera, between Cannes and Nice, at the time when the roses or jasmines, the jonquils or violets, are ready to be plucked by the ton for the manufacture of natural perfumery. The two thousand acres of sweet peas are not grown for their fragrance, however; they are raised for seed.

California, which boasts that many acres of sweet peas—one Eastern firm alone has three hundred near Santa Barbara—grows at least seventy-five of every hundred pounds of sweet-pea seeds used all over the world. Soil and climate are just right; seed can be sown in November or December, which brings the blossoms in the very early spring before the sun reaches that scorching intensity which often in a single day destroys the whole crop.

Fertilizer is not needed, and, more wonderful still, rotation, so necessary elsewhere, is not required! “They can be grown year after year on the same land, often producing better crops each year, provided, of course, that diseases are

kept out," as J. J. Taubenhauß remarks in his book *The Culture and Diseases of the Sweet Pea*, which every grower of what is at present perhaps the most popular of all flowers should have for advice.

Not all places in California are equally suitable for sweet peas. The ideal spots are the valleys where the fog rolls in from the ocean in the evening, keeping the air moist and cool, but satisfactory results can be achieved almost anywhere on the Pacific coast.

Maine is more favorable to the sweet pea than New York State or farther south till you reach a latitude where the seeds can be planted (as in California) in the autumn. I have had rows in my garden up here with vines so tall that I could not reach their tips with my fingers, and bearing numberless flowers. But the plants are cranky and fussy everywhere. While they stand a light frost or two, they must be carefully guarded against scorching heat, such as we have occasionally in August, July, or even June and September. How? Not by shading the vines—they must be out in the open—but by keeping the roots at cellar temperature.

Most gardeners who fail with their sweet peas—and many, unfortunately, do—owe their lack of success usually to their not bearing in mind these points: The ground (neither too sandy nor too wet) must be spaded at least two feet deep; the seeds must be put in at the

earliest possible chance (this cannot be over-emphasized), so that the roots may get far down before the hot days come; frequent cultivation; a *thorough* watering (way down to the lowest roots) whenever the soil dries out; and mulching a foot wide on each side of the row of plants with old manure, dead leaves, lawn clippings, or anything that will keep the surface of the soil cool while not excluding rain water. The essential thing is that the roots must always be cool and moist—not wet, for that excludes the air, which roots need as much as leaves do.

A THOUSAND NEW VARIETIES

Is it worth while to go to all this trouble when there are plenty of other flowers which are not so exacting? I should answer, "Yes," even if sweet peas were no better now than they were sixty years ago (when they had only nine known varieties), for think of the thrilling fragrance! But since that time more than a thousand new varieties have been added, making this a blossom so gorgeously and subtly varied that no amount of work is too great for the privilege of enjoying it.

Progress in beautifying the sweet pea has been made at an increasingly rapid pace, and just at present we are in the midst of the most important of all developments, which will make it possible—has, indeed, already made it possible—for any grower of this fragrant flower to

enjoy any or all of his favorite varieties much earlier—and later, too—than heretofore. I am alluding to the early or winter flowering sweet peas, the sensation of the last seasons, though little has been written about them.

To understand the full significance of this latest development in sweet-peadom we must cast just a glance at what led up to it. The gardener who immortalized himself as the creator of the modern sweet pea was an Englishman who lived to his eighty-second year, passionately devoted to his specialty. Henry Eckford was his name, a venerable-looking gentleman whom to see is to love, though it be but as pictured (see page 95 of the valuable brochure *Sweet Peas Up to Date*, by America's leading specialist, G. W. Kerr, published by W. Atlee Burpee in Philadelphia). As Horace J. White remarks in his beautifully illustrated little volume on this flower: "Eckford undoubtedly made the sweet pea a general favorite, and the sweet pea made the name of Eckford as music to the ears of all who love flowers." Substance, size, form, color, and fragrance—all were improved by him. Beginning early in the 'seventies, he had before the end of the century put out some seventy-five new varieties, which did much to popularize the sweet pea in America, too.

And yet his was far from being the last word on this fascinating subject. In 1901 Silas Cole, gardener to Earl Spencer, created a tremendous

sensation when he showed at a London exhibition the Countess Spencer, the parent of an entirely new kind, distinctly novel in form, with standard and wings not only larger, but beautifully frilled and waved. Hybridizers of several continents got busy on these, and to-day there are more than six hundred named varieties of the Spencer sweet pea (see Mr. Kerr's pamphlet for a full list). They are roughly grouped under nine general heads—white, cream or primrose, light pink, cream pink, claret and maroon, pastel shades, picotee edged, bicolor, striped, and flaked. Each of these includes an endless variety of detail.

THE AUSTRALIAN YARRAWA

Australia now comes to the fore with still another type, which, in the opinion of many seedsmen, will supersede the Spencers, just as these displaced the Grandiflora type of the Eckford era, although about 450 varieties of it still linger in conservative gardens. Yarrowa is the name of an Australian sweet pea which is remarkable for its big flowers, long stems, and its indifference to weather and temperature. Its color is a pleasing shade of bright rose pink, wings creamy pink, and it is a best seller in the market. Mr. Kerr has lately been using it in almost all his hybridizing experiments in developing the latest type of sweet peas—the Early or Winter Flowering Spencer sweet peas.

For the latest information regarding these I wrote to David Burpee, from whose answer I cite a paragraph which is illuminating:

The Australian sweet-pea growers were somewhat ahead of us in the early development work of the Early Flowering Spencer sweet peas. Ten years ago our Mr. George W. Kerr started to cross the Standard Spencer sweet pea with the old Early Grandiflora sweet pea on our Fordhook Farms, and after working several years he managed to get the true Spencer type into the Early Flowering class, and he has been working along that line continuously for ten years. In the beginning we, of course, had to use the Grandiflora as one of the parents in the cross so as to get the early-flowering habit combined with the Spencer form of flower. We are now listing forty-eight varieties of the Early Flowering sweet peas, every one of which we originated ourselves on our Fordhook Farms in Pennsylvania or on our Floredale Farm in California, with the sole exception of Yarrowa, one of the first Australian varieties which we imported to this country.

Yes [Mr. Burpee writes in reply to one of my questions], it is possible to secure all the colors of the Standard Spencers in the Early Flowering type. In fact, we already have all of the principal colors in the Early Flowering peas, and in addition have several shades which are entirely new and which we may cross in the Standard Spencers, hoping to get those shades also in the older type.

While thus retaining all the beauty of the Spencers, and even improving on it, the Early Flowering type has the tremendous advantage of coming into bloom a month or a month and a half sooner than the Spencers, now so deser-

vedly popular, and continuing in bloom, with intelligent care, four months.

During the war interest in sweet peas, as in all flowers, fell off considerably, but it came back again. "We sell by far more sweet-pea seeds than we do of any other class of flowers," Mr. Burpee informs me. "I have not yet," he adds, "our figures for the 1920 season, but in 1919 we sold over six hundred thousand packages of sweet peas."

CULTURAL DIRECTIONS

In England, before the war, more than forty tons of sweet-pea seeds were planted every year. This means nearly half a billion separate seeds! Be sure and get some for your garden this year!

And before you plant them don't fail to read the directions of Mr. Kerr in the pamphlet *Sweet Peas Up To Date*, to which I have already referred. Of special importance is his advice how to secure perfect germination; although as a rule there is no difficulty, especially if the seeds are soaked overnight.

I have given up growing sweet peas in rows. Clumps on the lawn are far better because it is easier to maintain a cellar temperature for the roots and keep the water from spreading laterally instead of going down to the business end of the roots. Make each hole as wide as you please (sowing the seeds along the outer edge)

and be sure to make it two feet deep. Fill the lower half (in the autumn) with inverted sods, tread down hard, and put on top of this a foot of good humus mixed with a few trowelfuls of wood ashes. Have a stout pole in the center and use brush to support the vines, giving them a chance, with smaller branches, to fasten their tendrils as soon as they are ready. My clumps are seven feet high and absurdly floriferous. I never use the same holes two years in succession—Maine isn't California!

CHAPTER XVII. MODERN PANSIES AND THEIR CULTURE

MODERN pansies are what Mark Twain would have called violets with a college education. They far excel that modest wayside flower in size, shape, and infinite variety of coloring, and their fragrance is even more thrilling.

In view of the fact that there are more than two hundred species of violets, this last claim may seem rash and reckless. I haven't nosed them all, and I admit that there are few things in this world so delicious as the fragrance of the white Parma violet (*pallida plena*) or of the tiny *Viola blanda* which hides itself along the mossy, cool banks of trout brooks and rivulets; but at any rate I feel that the poets, who are forever raving over the sweetness of the violets (most of which have no scent at all), have failed to do justice to the pansy's entrancing fragrance.

To throw a perfume on the violet is called by Shakespeare "wasteful and ridiculous excess," like painting the lily, gilding refined gold, or adding another line to the rainbow. Shakespeare, Milton, and other poets also refer to the pansies. They are called by various pet names, such as love-in-idleness, heartsease; but to their fragrance I can find no allusion in English poetry.

RECENT IMPROVEMENTS

Why this silence? Probably because the pansy's fragrance, like its varied, velvety colors, is a product of modern civilization and gradual intensification. Gerard, a sixteenth-century writer, said of the pansies of his time: "smel they have little or none." At that time the only colors worn by the heartsease were purple, yellow, and white or blue.

These old pansies, in truth, were little better than the Johnny-jump-ups we find in neglected gardens to-day. You have no reason to envy your grandmother. She, poor dear, never saw any pansies bigger or more alluringly colored than the common violets of the shaded roadside, and not so fragrant. Not till about a century ago were successful attempts made to educate this flower into something rich and strange. In the moist, cool climate of England, and still more of Scotland, the improved varieties flourished.

In 1830 a man named Thompson, gardener to Lord Gambier, introduced the first pansies with the blotches on the lower petals which now are taken for granted in the finest flowers. He also succeeded in changing the blossoms, which before him had been "lengthy as a horse's head," into the rounder shapes we admire. He took no merit to himself for originating the modern pansy, for, as he said, "it was entirely the offspring of chance. In looking one morning

over a collection of heaths, I was struck, to use a vulgar expression, all of a heap, by seeing what appeared to me a miniature cat's face steadfastly gazing at me."

The real Burbanks of the pansy were still to come. In the middle 'seventies of the last century three Frenchmen, Cassier, Bugnot, and Trimardeau, specialized in this flower and got results which astonished and delighted the whole world, just as Henry Eckford did with his new and improved sweet peas in England. The names of these French pansy educators are still preserved, as they should be, in our catalogues of flower seeds. The Trimardeaus are of immense size. Cassier achieved unique results with blotches in threes and fives. To Bugnot I feel particularly grateful for specializing in the new shades of reds and bronzes which are among the most dazzling of all pansies. The first cardinal flower I ever had in my pansy bed was evidently admired very much by somebody else, for on the morning after the first blossom had opened the whole plant had completely disappeared!

CATS' FACES AND OTHER FACES

Later hybridizers in several countries have gone even beyond these Frenchmen in obtaining larger and more velvety flowers, a greater variety of delicate tints and spots and of queer faces in the petals. In place of Thompson's "cats'

faces" we now see in some varieties of pansies the quaintest countenances, some smiling, others almost grotesque. No one can fail to detect the Russian peasant faces among them. Thus pansies are the most human of all flowers. As Harriet Keeler has put it, "The bright, cheerful, wistful, or roguish faces look up at you with so much apparent intelligence that it is hard to believe it is all a pathetic fallacy and there is nothing there."

A born flower lover does not need to know the genealogical details regarding the modern high-bred pansy to be enthralled by its beauty. Yet, if you are a born flower lover, you will admit that your interest is increased by a knowledge of these details. You will certainly, if you know them, peruse the pansy pages in your seed catalogue with increased interest in making your selections.

Unless you have a very large garden and plenty of gardeners, or wish to specialize in pansies, you will hardly find it worth while to buy individual varieties separately. The best mixtures sold by seedsmen who have a reputation to maintain usually include the best varieties. These mixtures of the choicest up-to-date pansies are rather expensive; but to buy cheap pansy seeds is about as wise as buying the cheapest medicines you can get when you are ill. The finest pansies are, in the seedsmen's jargon, "shy seeders." Among humans it is the same way—proletarians usually have the larger families.

HUMAN TRAITS OF PANSIES

Pansies are like humans in still another way. Some are overbig and loud and commonplace and vulgar—I positively *hate* them. Strange to say (or is it strange?) these coarse yellows and purples are the ones which, in full bloom, take up most of the room in the boxes of plants sold by the thousands in early spring. Fortunately, most people are not so fussy as I am. Whenever I see one of these vulgar pansies in my garden, out comes the whole plant. Its room is more desirable than its presence. Tastes differ, and doubtless some persons honestly admire the glaring, insolent yellows I detest; but I am glad to say they and the dull purples are seldom to be found in the most expensive mixtures, which shows that the pansy epicures who raise the choicest seeds share my taste. Some yellows are lovely—especially those with a light-greenish tinge. These are gems, ranking in value with the snow white and coal black and sky or dark navy blue and blood red and pink and rose and bronzes and coppers and their endlessly varied combinations—blotched, flaked, and veined in contrasting colors. I know few garden experiences so exciting and fascinating as watching the pansies in a new mixed bed successively unfolding and surprising us with novel faces and color shades and contrasts.

There are two reasons for not trying to raise your own pansy seeds. If you let the blossoms

change into seed capsules you will soon have no more, for every plant thinks it has done its duty as soon as it has provided for the next generation. That's one reason; the other is that in the hands of nonprofessionals pansies run down quickly in size, color, and all that makes them lovely. Therefore, I repeat, plant nothing but the most expensive seeds from the most reliable firms. Don't balk at the price. It takes twenty-five thousand seeds to make an ounce; and the best, to say it again, are "shy seeders." Let the artists—for artists they are—who originate and raise the choicest varieties have a reasonable profit.

The best time to start pansy seeds is in August. Plants born in midsummer and well cared for with plenty of water until the fierce heat abates, grow big enough to bloom a month or so before the snow comes to cover them. In spring these same strong young plants burst into full bloom as soon as the snow melts away, vying in earliness with crocuses and Iceland poppies.

The almost universal American habit of letting pansy plants die in July or August is deplorable. To be sure, the scorching sun mercilessly diminishes their size if allowed to have his way. But he can be thwarted. You can keep your pansies big and fragrant and happy all summer if you will. Three things are necessary: frequent stirring of the soil, thorough weeding, and daily watering. A little liquid

sheep or hen manure (very weak) added to the water two or three times a month will do the rest—provided you pick the blossoms every day or two. Hens keep on laying only when you take away the eggs.

Pansy plants started in August one summer can be kept full size till November or even December of the next year if during the second August all the old straggling shoots are cut out close to the ground and the soil is enriched by stirring it around them and working in a little bone meal and wood ashes or a minute quantity of pulverized sheep or old hen manure. These are also the best foods to use when first preparing the bed for the pansy seeds or plants. If, in addition, you have, five or six inches below the soil thus enriched, a layer of inverted sods (clover preferred), you will have flowers deserving a gold medal at the state fair. The rotting sods will tempt the roots to grow down where it is cold and moist.

It is not best to grow pansies in the shade of a tree or a building. Noonday shade may be an advantage when the plants are not freely watered; but when they are, the best location is in the open, where the wind can sweep over the bed, wafting the pansy fragrance toward your piazza.

A last word. Why do the seedsmen in their catalogues never mention that pansies are fragrant, as they do in the case of other flowers?

CHAPTER XVIII. GARDENERS WHO PAINT THE LILY

MY friend J. C. Rodriguez, formerly editor and owner of the leading newspaper in Brazil, has repeatedly invited us to spend a summer with him in his country. We would go were it not for the fact that, though a millionaire, he does not own an airplane. I should want an airplane at my disposal so as to be able to see the gorgeous flowers of the Brazilian forest. Don't think I am losing my alleged mind. I have never been in Brazil, but after reading Herbert H. Smith's descriptions in his book on that country I have come to the conclusion that the only way to see the floral wonders of a tropical forest is from above.

The Brazilian forest has a roof garden. "In the thick forest one hardly ever finds a bright flower; certain trees are splendid in their season with yellow or purple or white, but you see nothing of this from below. Strong colors always seek the sunshine," and the sunshine does not penetrate through the densely matted roof of the dark and gloomy forest. Up on that roof you find not only the tree blossoms, but the orchids and other air plants, and a great variety of vegetation which adopts the habit of climbing a hundred or two hundred feet on tree trunks

as the only way of exposing its flowers to the sunshine.

I foresee the time when airships will daily take tourists from Rio for a sail across the tropical roof gardens.

WILD-FLOWER GARDENS

Our own wild flowers may not be so exotic and brilliant in color as the Brazilian orchids and tree blossoms, but it is some advantage to have them grow on the ground instead of on treetops, accessible only to parrots and monkeys and airmen. What would Mrs. Theodore Thomas have done in Brazil? She had the happy thought of making up her garden entirely of transplanted wild flowers and some other plants that are hardy enough to fight their own battles, as the wild ones do, in the severe climate of the White Mountains. Beginning with a wheelbarrow-load of black-eyed Susans to cover a discordant wall, she continued to add flowers, shrubs, vines, and weeds till she had so many that a list of them takes up ten pages of her chatty little book, *Our Mountain Garden*.

She was particularly partial to weeds because "if one gives a good weed the least chance it is so grateful, and so easily turned into a handsome flower." The pale little lilac wild aster, for instance, "is luxuriant in a cultivated border. Each plant sends up a dozen or more stalks three feet high, which are covered with

such a riotous mass of fairy flowers that they look as if enveloped in a cloud of lavender foam."

Here we have an instance showing how the gardening mania is transforming and beautifying this world and making life more worth living. Apples, pears, peaches, cherries, and all the other fruits that we enjoy were originally weeds—sour, astringent, small, almost or quite inedible, or even poisonous; the college education the gardeners gave them made them what they are now, and the same is true of flowers. The little lilac asters which Mrs. Thomas gave a chance to show what they could do are pretty enough as they stand in the farmers' pastures, but she undertook to paint the lily and gild refined gold, and succeeded, Shakespeare to the contrary notwithstanding.

This painting of lilies has indeed become the fashion among gardeners, and a fascinating fashion it is; a fashion which has transformed their occupation into a fine art ranking with music and painting, architecture, sculpture, and poetry, because not only is its material of the very essence of beauty, but it gives endless opportunities for the exercise of creative imagination.

THE SHASTA DAISY WAS A WEED

Luther Burbank's success is very largely due to the fact that he is an artist, a floral epicure

of exquisitely refined sensibility. One time he had a row of daisies all of which seemed equally white to his assistants and to a number of other persons, though his eyes told him that one of them was nearer a pure white than all the rest. But one day an artist from San Francisco visited his garden, and when she was shown the daisies she exclaimed at once that there was one much whiter than the rest, and pointed to the one he felt was nearer to purity in whiteness than any others of all the thousands of daisies in his garden.

That flower became one of the ancestors of the famous Shasta daisy, now sold by all seedsmen everywhere. Its other ancestors were an English large-flowered daisy and a pure-white Japanese variety. And thus by careful intermarriage Burbank transformed a common roadside weed of New England into a thing of beauty and a joy forever.

He has done the same thing with other plants, and, he says, "there is still an indefinite amount of material among our wild plants from which garden plants might be developed." "To name all that are worthy of consideration would," he adds on another page of Vol. X, "take many volumes, for there are more than ten thousand species of flowers indigenous to the United States, and of these only something like fifteen hundred have at one time or another been placed under cultivation." He advises amateur

gardeners to cultivate some of the neglected weeds and enjoy some pleasant surprises. "A weed is but an unloved flower," is one of his maxims.

It is not only weeds that can be changed into something rich and strange. It is a striking characteristic of the Burbank age of horticultural evolution that many flowers which seemed good enough to our ancestors have been so beautified and "painted" and transformed that our grandmothers would hardly know them. The "old-fashioned garden" flowers are nice to talk about, but they wouldn't please us if we now saw them side by side with their educated descendants.

This is true particularly of pansies, poppies, sweet peas, peonies, dahlias, gladioli, nasturtiums. But there are many others in which the recent changes and improvements are quite as astonishing and thrilling.

The snapdragons and larkspurs and zinnias of to-day, for example, are infinitely more varied and artistic than those of the last century, and the same may be said of verbenas, salpiglossis, cannas, tulips, and other bulbs, irises, cosmos, asters, columbines, petunias, and many others.

Hundreds of professional gardeners, as well as amateurs, have been busy in recent decades "painting the lilies" and other beautiful flowers. Hundreds of others, Mr. Burbank urges, should indulge in this fascinating occupation, which

enables anyone to put the stamp of his own personality and taste on the plants with which he experiments, and to have a flower garden differing from all others in the world.

PETUNIAS AND DAHLIAS

How proud and happy Mrs. Thomas Gould of Ventura, California, must have felt when she was able, after some years of artistic selection and hybridizing, to give to the world *her* "painted lily," *alias* the improved petunia, known and prized everywhere as the Giant of California. The old-fashioned petunia a century ago had one conspicuous merit—the rich perfume it exhaled at nightfall. In all other respects it was gradually made more attractive, and Sir W. J. Hooker referred to it as one of many plants in which "the art and skill of the agriculturist had improved nature." In size, form, and color it continued to be beautified, till the climax was reached in Mrs. Gould's strain, no two plants of which give identical blossoms; to watch the buds open is one pleasant surprise after another.

A few years ago I was simply stunned by an exhibit of dahlias in a florist's window on Tremont Street, Boston. From the simple, crude, original form to the latest developments of the cactus dahlia, here they were, a demonstration of horticultural genius. The new race of dahlias, as developed and improved by Burbank

and many others, is, in his words, "so utterly divergent from the parent form as to be almost unrecognizable"; yet, as he adds, this flower offers "an infinity of variation which has only been tapped." He likes the single ones best. At the dahlia show in New York in the summer of 1921 more than five hundred varieties were exhibited.

There were Burbanks long before the Californian. They achieved such marvels with some flowers that no finishing touches were left to be added by his master hand. The peony is an instance. It was known to the ancient nations, but they seem to have cultivated it chiefly for medical and superstitious reasons. In the 'sixties of the last century the peony was made popular in England by James Kelway, who introduced one hundred and four new single and double varieties. Now there are over a thousand, vying with one another in color and fragrance.

We must not forget that China and Japan had their Burbanks hundreds of years ago. Think of their unspeakably glorious irises and morning-glories and their astonishing chrysanthemums! The Japanese were probably the first to show the world that gardening is a fine art and that it is worth while to paint the lily and perfume the rose.

CHAPTER XIX. THE FRAGRANT SOUL OF FLOWERS

I HAVE a vague recollection that Ruskin, in one of his passionate random paragraphs (the great art critic was almost as discursive and by-the-wayward as Mark Twain), spoke most disrespectfully of flowers which have no fragrance; that, in fact, he wiped up the floor with them. I cannot now find this paragraph, nor has a trained employee of the Boston Public Library been able to find it for me, so I may be mistaken.

If Ruskin did not disparage scentless blossoms, I have felt tempted to do it myself, many a time. The common blue violet, which in May adorns our wayside by the millions, is pretty, but how much more enjoyable it would be if it had the delicious fragrance of its more favored sisters, the *Viola odorata* and the tiny white *Viola blanda*, or of the *canadensis*, or of its cousin, the pansy. Or take the rose. Don't you feel disappointed and almost resentful every time you pluck one and find that it has none of the many rose odors? With poppies or gladioli it is somewhat different, because you don't look for fragrance; but they, too, would be doubly attractive if they had it. Fragrance is the soul of flowers as expression is the soul of music and flavor the soul of food. A blossom without it is like a beautiful girl without a soul.

There are two ways to avoid disappointment

in the flower garden. We can either grow only those blossoms which are scented or we can impart fragrance to those which have it not—one of the most alluring tasks of plant breeders and educators of the future, following the trail blazed by Burbank.

Fortunately we need not wait for these floral perfumers of the future, for we have a large number of sweet-scented blossoms of all kinds. (I have already written briefly on this topic in the chapter on "Favorite Garden Flowers," but it is so important that I must dwell on it at greater length.) To name only a few of each kind, we can have a garden and surroundings adorned with fragrant trees like the linden and locust; fragrant bushes like the lilac, mock orange, Bechtel's flowering crab, roses, Tartarian honeysuckle, and the heavenly strawberry bush (*calycanthus*); vines like the Belgian and Japanese honeysuckle, roses, grapes, wistaria; bulbs like the hyacinth, tulip, jonquil, poet's narcissus, tuberose; perennial plants like the peony, yellow day lily, carnation, Iceland poppy, phlox, lily-of-the-valley; and a number of annuals, besides divers fragrant herbs.

For my little nephew I provide every year a special garden of fragrant annual flowers and plants, which I cannot commend too highly as a source of pleasure. The list includes stock, phlox, sweet alyssum, heliotrope, nasturtium, Burbank verbena, lavender, catnip, peppermint,

four-o'clock, lemon verbena, rose geranium, African marigold, nicotiana, schizanthus, mignonette, and two exquisite aromatic novelties just introduced by Luther Burbank—the Australian coconut geranium (which will become a rival of the delectable rose geranium) and the “Brazilian perfume,” the leaves of which, when rubbed, give one a new sensation of delight, as distinct, intense, and refreshing as oil of lavender.

FRAGRANCE INTOXICATES, LIKE MUSIC

Pansies and sweet peas would, of course, be included in this garden of fragrant annuals, but they are bedded elsewhere. The pansy's fragrance is even more thrilling than that of any violet; I have spoken of it in another chapter. As for the sweet pea, I think it is my favorite perfume; there is something ethereal, refined, delicate, yet intense, about it that ravishes my olfactory nerves and makes me dream of celestial bliss. Much as I love sweet peas for their delicate contours and varied colors, their fragrance is still dearer to me; I can get forms and colors in other flowers, but the fragrance is unique; to lose it would be a calamity; and there is danger ahead.

The late W. Atlee Burpee once wrote me that he had advised Mr. Burbank not to waste any of his precious time trying to improve sweet peas, because they were well-nigh perfect. But the early-flowering habit was still to be inbred,

and in his Vol. IX, p. 27, Burbank calls attention to another important point. One of the Eastern seedsmen who raise their sweet-pea seeds in California showed him with great pride some lovely new varieties, and was not a little surprised when Burbank called his attention to the fact that they had no fragrance whatsoever. In his eagerness for form and color the grower had neglected the perfume. "Like perhaps most others, he had taken it for granted that all varieties of fragrant flowers are fragrant. Series of experiments in cross-breeding would be necessary to reintroduce the perfume to these varieties that have lost this finishing quality."

Before Burbank's own achievements became known that last sentence would have seemed absurd. How can anyone put a scent into a flower which has none? He did it years ago, and if you want to know how, see the references under the word "Fragrance" in the index to the twelfth volume of his works. Anyone is at liberty to follow his methods, and there is plenty of opportunity for the exercise of ingenuity and patience, for there are hosts of beautiful flowers that clamor for fragrance because they feel their inferiority.

A French botanist says that in Europe alone about forty-two hundred species of plants are utilized for various purposes, and that only about one-tenth of them have an agreeable perfume, the others being either inodorous or malo-

dorous. Unpleasant odors can be changed into agreeable ones, as Burbank showed in the case of the dahlia, and perhaps, if we all got busy, there would be no unfragrant flowers in the gardens by the end of this century.

EDUCATING THE SENSE OF SMELL

My little nephew enjoys the blossoms and leaves in his own fragrant garden very much. Before he was a year old I used to surprise him with faint whiffs from the tiny vial of oil of bergamot I always carry in my vest pocket. (It often proves a stimulant and life-saver in concert halls and theaters.) He always greeted these whiffs with a pleased smile, and to-day he takes almost as much pleasure in refined perfumes as his uncle does, while his nose helps him to recognize things. Ten minutes ago he brought me a stick and asked me to cut a notch in it. Then he smelled the chips and said, "That's pine."

Once, when our neighbor's piggie had run away into the woods, I said to him: "If that piggie cries "Wolf!" twice when there is none, we won't run to help him when the wolf really comes and he calls for help a third time. So you see, pigs and boys must never tell lies." To which the five-year-old promptly replied, "Specially pigs!"

It pays to make a fragrant garden for a boy as bright as that. I very much doubt if he would have been so bright had I not taken pains to train all his senses. If children had all

their senses trained they would, as adults, find this a very much more interesting world than most persons do now. Though we look on sight as the most important sense, few of us learn even to see, except vaguely. If you don't believe this, read, for example, Ruskin's chapters on clouds, in his *Modern Painters*. You will marvel at the many beauties of nature he saw which had escaped your notice. You look vaguely at the mouths of men and women you talk to, but you do not see the subtle movements which enable a deaf person to read on your lips every word addressed to him.

I never fully realized how shamefully I had neglected my sense of touch till I saw a copy of my *Chopin* as reprinted for the blind. The groups of dots which tell the whole story to those who cannot see were not distinguished by my dull finger tips. But, thank Heaven, I did learn from my infancy to use my senses of sight, hearing, and smell. Had I not done so, I should not have seen all the entrancing things in women and scenery that impelled me to write five books about them; I should not have recorded my enthusiasm for good music in half a dozen volumes, nor spent several years of my life collecting facts to prove, in *Food and Flavor*, that nine-tenths of our enjoyment of food is due to the sense of smell, exercised in a way of which most people haven't the faintest consciousness.

The use of this knowledge has made me a superepicure in matters gastronomic, and also in the enjoyment of natural perfumery, which I wouldn't exchange for all the wealth of a Rockefeller. The fragrance of flowers exhilarates and intoxicates me like the music of Schubert, Chopin, Wagner, or Grieg. When I can have that I do not miss the bouquet of vintage wines, of which the excesses of whisky drinkers have unjustly deprived me.

NATURAL PERFUMES BEST

Prohibition would never have been necessary had those who engineered it taken pains, instead, to train the senses of children to prefer a delicate bouquet to a gross stimulant.

The art of perfumery has a great future. The artificial coal-tar perfumes from Germany have temporarily damaged a good cause, but the infinitely more refined and individual odors of flowers will drive them out again in due time. Natural perfumery, condensed from flowers, is necessarily expensive, but in our gardens we can all enjoy it for a trifling cost.

Most people feel that they must be allowed some sensual delights. As ex-President Eliot of Harvard once said, "Men are animals and have a right to enjoy without reproach those pleasures of animal existence which maintain health, strength, and life itself." Of all these pleasures the enjoyment of the fragrant soul of flowers is

surely the most innocent. It should be encouraged in every possible way; beds of fragrant flowers should be in every garden for the delectation of both children and adults.

They can be made a source of profit, too. A young Southern woman I have heard of derived from her home-made perfumes a larger income than she ever made as a teacher. Early in the morning she picked the blossoms of roses, tuberose, wild violets, or crabs, placed them between layers of cotton wool soaked with olive oil, changing the blossoms daily for a week, and then squeezing the oil, mixed with a little oil of cloves to make the fragrance permanent, into the mouth of a filter over a bottle.¹

The demand for these perfumes greatly exceeded the supply, for there are thousands of persons who know—what the ancients of Bible days already knew—that fragrance is exhilarating, antiseptic, hygienic. A little vial of perfumery from the garden, or a visit to the garden itself, is worth more for refreshing the jaded mind than highballs, tea, or coffee.

A SYMPHONY OF LILY PERFUMES

Luther Burbank is, I feel sure, indebted to his passion for fragrant flowers for much of the

¹ Interesting details on this subject may be found in Bulletin 195 of the U. S. Bureau of Plant Industry, entitled "The Production of Volatile Oils and Perfumery Plants in the United States." See also "Perfume Making" in Black's *Gardening Dictionary*.

youthful health and vigor he has preserved into his seventies, for reasons I have previously referred to. In a delightful little book for children, *Stories of Luther Burbank and His Plant School*, by Effie Young Slusser, Mary Belle Williams, and Emma Burbank Beeson (Scribners), there is a page which vividly describes his enjoyment of his new creations in color and fragrance. He spent a quarter of a century in experimenting with lilies of all kinds, from all parts of the world. Two hundred and fifty thousand of them there were, covering two acres near Sebastopol, out of which he selected fifty that came up to his ideal.

“In June, when the blossoming season came, rare mingling of perfumes filled the air—thousands of odors blended into one. Nothing like it had ever been known before in the whole world. The people of the Gold Ridge section wondered and wondered what it could be, and they came from all around to investigate the causes. As they came nearer and nearer, such a mass of beautiful colors spread out before them as they had never before even dreamed of. When they came close the lilies nodded and nodded and swung their censers, bidding them behold their exquisite colorings and quaint forms, for nothing in the world could compare with them.” Some of them were “proud of their fragrant white dress”; others relied more on their shape and colors. “A few bore as many

as fifty flowers on one stalk; and there was one that carried ninety-one flowers on a four-foot stalk."

And the man who most of all enjoyed these new sights and perfumes was the master who had created them.

"Can my thoughts be imagined," said Burbank, "after twenty-six years of care and labor, as I walked among them on a dewy morning, and looked upon these new forms of beauty upon which other eyes had never gazed? . . . A new world of beauty seemed to have been found, and I was fully rewarded for all the care I had bestowed upon them."

Let me add a word of warning. Don't think your flowers are not fragrant because they have no scent in the daytime. Some of them have it all the time, but many plants swing their censers only in the evening and early morning. The fragrant tobacco plant (*Nicotiana affinis*), for instance, bears hundreds of large snowy blossoms at once. In the daytime it seems made for eyes only; but visit it by full moon and you will be reminded of the stories of the spice islands which intoxicated the senses of mariners before they could see them.

CHAPTER XX. ARE PIGS GENUINE EPICURES?

ATENNYSON votary called his pig Maud because it "came into the garden" so. He was evidently a cousin of the man who called his favorite hen Macduff, and, on being asked why, quoted Shakespeare as his reason. "Lay on, Macduff, and damn'd be him that first cries, 'Hold, enough!'"

A friend of mine in Vermont was surprised one morning to find one of his neighbor's pigs in his garden, though the gate was closed and no hole could be found in the fence. On being chased, the porker revealed his entering place—a hollow log that formed part of the foundation of the fence.

Being a humorist, my friend at once saw his chance to have some fun with piggie. He managed to fix the fence in such a way that both ends of the log were outside the garden. The surprise and growing bewilderment of the intruder when he found himself again and again outside were most comical. A movie reel showing it would have made the man's fortune.

There are good reasons why pigs come into the garden so; they are crazy for greens—as crazy as woodchucks or cows; and gardens, of course, furnish the juiciest of greens. It has long been known that hogs prosper particularly well in pastures, but it is only lately that the

farmers who raise swine have come to realize fully that, besides bran, milk or buttermilk, and corn, greens are of prime importance as fodder because they abound in the growth-producing food salts.

CLOVER-BLOSSOM PORK

Three times a day I go down to the garden and bring up an armful of greens—succulent weeds, corn suckers, or anything else not needed by the family—and throw them before our two colored piggies, Sambo and Jumbo. You have heard that “pigs is pigs” and maybe you think that, so far as porkers are concerned, “greens is greens.” As a matter of fact, pigs differ in matters of taste individually. One year we had a pampered white pig which ostentatiously preferred white clover blossoms to everything else. We used to pick huge bunches of these blossoms for him, our visitors helping. He gave me visions of a new brand of hams and bacon surpassing the best now in the market. “Clover-blossom Pork Products Company”—how would that do for a firm name?

Of course, the meat would be *really* smoked—not painted with creosote. We have, by the way, a new fifty-dollar metal smokehouse with coiled pipes to cool the smoke before it reaches the meat. You ought to have seen how stuck up our pigs were last October when I told them that the metal box was a sanitarium and that they were the first ones to be cured in it.

Jumbo and Sambo are less fastidious and less partial to white clover than their predecessor was, but they have their preferences all the same, and when I throw an armful of weeds into their pen I know exactly which ones they will eat first. I am a little worried about their indifference to suckers, for when the corn ripens stalks will be the bulk of their food—a most economic fodder. I'll have to starve them a day to make them realize how delectable young corn stalks are for pigs. (In parenthesis, have you ever seen a cow take hold of a six-foot cornstalk and swallow it in about six seconds? Another reel that would earn a fortune. With cattle it is never an acquired taste, and I didn't know till recently that it ever is with pigs.)

In their drink Sambo and Jumbo are quite as fastidious as in their fodder. They like to have the children pour bottles of cold water on their backs on hot afternoons, but for water internally—though they were born in an old-time prohibition state—they have little use—unless it is well flavored. If the trough is filled with plain water they poke their snouts in it, make bubbles, and, with a disgusted look, pass on to the corn I have scattered about in the grass for them. If the water is flavored with scalded cereals they drink some of it slowly; if with plenty of milk or boiled meat from the soup kettle, they drink it eagerly. If I gave

them a pail of cream I am quite sure it would vanish in considerably less than no time.

A MALIGNED PHILOSOPHER

Are pigs epicures? In Oregon, as a boy, I used to gather the windfalls in the orchard in a basket and throw them over the fence. Did the pigs fall upon the apples and devour them, one after the other? Not a bit of it! They nosed them over, bit them in two, till they found the ripest and sweetest, which they ate; whereupon they gave their attention to the inferior ones.

That is not the way of the genuine epicure. He keeps the best for the end; sweets and dainties he reserves for the dessert. Nor does he ever overeat, as pigs do every time they get a chance. As I have said elsewhere, "A true epicure would no more dull the edge of his appetite for future pleasures of the table by over-indulgence in food or drink than a barber would think of whittling kindling wood with his razor." As Horace Fletcher remarked: "An epicurean cannot be a glutton. There may be gluttons who are less gluttonous than other gluttons, but epicurism is like politeness and cleanliness and is the certain mark of gentility."

Never was a philosopher more misrepresented and maligned than Epicurus. It may not be too late to come to his rescue, as he died only two centuries more than two thousand years

ago. In these years, to be sure, slanderous misconceptions have become so firmly entrenched that it will probably take another two thousand two hundred years to rout them. Wordsworth voices the general view when he refers to epicureans who "yield up their souls to a voluptuous unconcern"; while the dictionaries indulge in nonsensical talk about epicures as "given to indulgence in sensual pleasures," or as "pursuing the pleasures of sense as the chief good."

There are plenty of persons who do that sort of thing; but they are not followers of Epicurus. He expressly and emphatically preached the simple life, warning his disciples to abstain from sensual indulgence, so as not to impair their health or dull the edge of refined enjoyment. True, he taught that pleasure is the chief good, but he also preached that pleasures which have evil consequences should be rigidly avoided, and this avoidance constitutes, in his doctrine, the greatest of all virtues.

He taught, also, that mental pleasures are more intense than the pleasures of the body. Don't forget that!

Decidedly no! Sambo and Jumbo, with all their subtle and stubborn preferences in the matter of fruit, greens, and drink, are not genuine epicures, and that makes them seem quite human, for most humans are not epicures, either. If they were I need not have written my book on *Food and Flavor*, which is nothing

more or less than an attempt to show that there can be no health or strength or enjoyment of life unless we enjoy the right food the right way.

IF ALL WERE EPICURES

If everybody were as epicurean as I am, what a different world this would be! How most of the bad, mediocre, and good things would be swept away, leaving only the best! Insipid fruits, wilted vegetables, frozen fish and meats, denatured bread and cereals, and all other objectionable things would disappear, because no one would buy them. Health, happiness, and longevity would flourish as never before. Everybody would have his own garden and raise in it only the most improved vegetables, fruits, and flowers, and Luther Burbank would, of course, be Secretary of Horticulture. But, no! I wouldn't have him leave his experimental gardens at Santa Rosa and Sebastopol for all the world. Wonderful things are brewing there.

Luther Burbank is a floral as well as a vegetarian and fruitarian epicure—for epicurism includes æsthetics as well as gastronomy. Epicurus was right when he taught that mental pleasures are keener than bodily joys. To eat the improved Santa Rosa fruits and berries is a delight, but it is not to be compared with the thrills which the sight of Santa Rosa flowers gives.

The other morning I was moved to tears by the indescribable glory of my bed of Burbank's Shirley Art poppies—*Art* poppies, indeed! for no genius among the great painters ever conceived anything more delicate in varied loveliness of color and texture. Look at the marvelous color pictures in the ninth volume of Burbank's works—there is nothing equal to them in all the illustrated books I have ever seen—and if you don't have a bed of Santa Rosa Art Shirleys in your garden next summer you are not a flower epicure. I shall have more to say about them later on.

CHAPTER XXI. EDUCATED STRAWBERRIES AND BURBANK PLUMS

HOW much will strawberries cost in 1940? About eight dollars a quart! How do I know? Well, I got a "condition" in arithmetic (as well as in algebra and geometry) when I entered Harvard, but I can do some figuring, nevertheless. Twenty summers ago I spent a month with one of my sisters, who lived near East Portland, Oregon. Her home had three great assets—a glorious view of Mount Hood, snowclad all summer; some remarkable cherry trees, of which more anon; and a large strawberry bed. Oregon is as famous for its fragrant wild strawberries as France is for its *fraises des bois*; give these luscious berries the advantages of a "college education" in a garden, as Mark Twain would say, and—well, if Webster could have tasted them he would have defined ambrosia in his dictionary not as food of the gods, but simply as Oregon strawberries.

Ambrosia was so easy to raise in that state that the market was glutted. It cost one cent for a basket, and another cent for a Chinaman to fill it with berries. And the Portland grocers refused to pay more than two cents a quart! Consequently these incomparable berries were

left unpicked—except those we selected for our table. Now, to jump from Portland, Oregon, to Portland, Maine, or thereabouts, we were paying for strawberries, in 1920, forty cents a quart. That's just twenty times as much as was paid twenty years ago; consequently twenty years hence strawberries will be twenty times forty cents, or eight dollars a quart—any schoolboy could figure that out.

If, at present prices, more than twenty-five million dollars' worth of strawberries are sold in the United States every year, twenty years hence, at eight dollars a quart— But let us drop arithmetic, it isn't popular—boys usually make a bonfire of their mathematical school books.

It is interesting to know that Americans eat half of all the strawberries marketed in the world (when we like a thing we do like it, "sure") and that New York is the greatest market for this berry in the world. It was so, for that matter, as long ago as 1849, when the Erie Railroad alone brought into the city (population, 300,000) no fewer than eighty thousand baskets in one day. Yet a century ago, in the year 1820, a few wagon loads of Hackensack berries, brought across the Hudson in sailing sloops twice a week, when wind and tide permitted, constituted New York's entire supply, as F. H. Hexamer informs us; and—listen!—a period of three weeks comprised the limits of the strawberry season!

Three weeks! At present, if we have plenty of money, we can have them every month in the year and everybody can have them six months out of the twelve; partly because they come first from the far South and finally from the far North, but chiefly because the growers have in course of time developed five types of berries—the very early, early, midseason, late, and very late. The word “everbearing,” applied to any particular variety, must at present be taken with a grain of chloride of sodium, but we are getting there. Hundreds of garden maniacs have been busy trying to improve the strawberry in various directions. Scarcely a dozen of them, we are told by Prof. S. W. Fletcher of the Pennsylvania State College (who has written a fascinating book on *The Strawberry in North America*) have had any financial reward for their efforts, but creative gardening is such an enjoyable occupation that few object even if it is only a labor of love.

JOHN BURROUGHS DELIGHTED

Luther Burbank, as usual, is in the lead. He has created some luscious new varieties by hybridizing our best berries with choice seeds from Chile and other countries where this berry excels, wild or cultivated. I myself had the good fortune to taste some of these one afternoon at Santa Rosa, California, in company with John Burroughs, who was quite ecstatic over the Pat-

agonia, our host's latest creation. It had a delicious pineapple flavor, blended with its own aroma; I also tasted a white berry which made me exclaim that to put sugar and cream on it would be a crime.

The importance of Burbank's new varieties lies in this, that he has aimed at flavor rather than at color and size. To cite his own words, "I thought that a good home strawberry that is tender, sweet, and of fair size, rather than of exaggerated proportions, combining these qualities with the exquisite flavor of some of the wild berries, would be a distinct acquisition."

The final stage in the perfecting of the strawberry will be, in his opinion, the elimination of the seeds which dot its surface, partly because they mar the texture of the berry and partly because they make a needless draft on the energy of the plant. But this is less important than his emphasizing of the flavor. Poor, dear flavor! It's the one thing the consumer really wants (though he coquets foolishly with size and color) and the one thing he seldom gets at its best, unless he raises choice varieties in his own garden and lets them ripen on the vine.

It's an old story, this conspiracy against the consumer, this substitution by wholesale and retail marketmen of productiveness and good shipping qualities for flavor; this triumph of mediocrity over merit. For twenty years the berry favored by them was the Wilson, which

that noted epicure and preacher, Henry Ward Beecher, denounced as "the wickedest berry that was ever indulged with liberty. It is an invention by which the producers make money out of the consumers' misery. It has every quality of excellence except in the matter of eating. . . . It might live in a sugar bowl and be acerb and crabbed still."

There were luscious berries in Beecher's day, but the public had no chance to buy them. And to-day? Listen to Professor Fletcher: "Aroma has been sacrificed as well as flavor. A handful of the early Pines and Scarlets perfumed a room with delightful and appetizing fragrance. Few contemporaneous sorts have more than a faint and fleeting aroma." Among those that have aroma and flavor are Brandywine (*sit venia verbo!*), Monarch (ditto), Longworth's Prolific, and some Texas varieties which Burbank crossed with Chilean, Virginian, and Californian sorts before he reached the ideal berry referred to, after he had grown and fruited some half million seedlings, representing every corner of the world.

The time may come when every man will be his own gardener, and then all will be able to enjoy such berries. To be sure, considerable horticultural skill is required to raise strawberries, and everybody is at the mercy of rain and shine. The sun is needed to supply the fragrance and flavor, and as for rain or irrigation, "it is defi-

nately known that it takes six hundred barrels per acre to mature a crop after the fruit is set."

For most of us evidently there is little hope for better berries unless we can reform the marketmen. Luckily, even mediocre berries have their charm—at least with cream and sugar, or in shortcake.

BURBANK'S NEW PLUM FLAVORS

Burbank's favorite method of using seeds or grafts of wild berries to impart a rich flavor to his new hybrid creations is also exemplified in his cherries and plums. I referred to some remarkable cherry trees on my sister's place; they were blends of wild and cultivated varieties, and their flavor was superlatively rich and entrancing. I am glad to know that Mr. Burbank is at present engaged in work along this line. I wish also he would give the sour cherry a tougher skin to make it easier to transport ripe to a distance. To me a sour cherry is infinitely more luscious than the sweet sorts. The best I ever ate were at the Swiss château of Paderewski, who shared my preference. They were a variety he had brought from Poland. Remember that no less an epicure than Lucullus introduced the sour cherry into Europe. Remember also that when thoroughly tree-ripened "the so-called sour cherry is nearly sweet and the mild acid is very wholesome," to cite E. P. Powell, whose *The Country Home* is the best

guide I know for amateur gardeners and orchardists who wish to raise better berries and fruits than can be brought from the horribly selfish and short-sighted marketmen — short-sighted because it seldom seems to occur to them that when fruits are alluring in flavor customers are tempted to buy ten times as often as when they are insipid.

A word about the plums in which Burbank has so marvelously blended the flavors of American wild varieties with European, Japanese, Chinese, American, and other cultivated kinds. What importance he himself attaches to these new hybrids you may infer from the fact that he has devoted a whole volume to them in the gloriously illustrated set of twelve books which relate his life work in detail—books which no progressive gardener can afford to be without. The plum volume is as fascinating as a romance—more so to those afflicted with the gardening mania. I have read it three times.

In 1912 no fewer than 564 carloads of Burbank plums, making more than one-third of all shipments, were railroaded east from California; yet the best of the Burbank varieties are only beginning to be known; they are the result of thirty years of hybridizing—of tossing seedlings from all the world into the “Santa Rosa melting pot,” as he calls it. Since 1885 he has introduced sixty-two varieties. Among them are plums the flavor of which suggests the peach,

apricot, apple, pear, lemon, orange, banana, pineapple, and berries of various kinds. Specially notable for flavor are the Nixie and the Geewhiz—the latter so named because a visitor, after biting into one, used that word to express his gustatory delight.

The "Reds" in the market are among the most interesting. They are descendants of a Satsuma plum which the Japanese call Uchi-Beni (red inside), imported and improved by Burbank. A basket of these is on my table as I write this, filling the room with a fragrance vying and blending with that of a bunch of rose-scented peonies.¹

In 1920 Burbank issued a list of new and standard fruit trees, walnuts, and berries marked "Very Special." In this list he describes ten more of his plums, among them "Beauty: the best shipping plum ever produced; great bearer; big, delicious fruit; extra early," and "Thunder Cloud: New: The most beautiful metallic purple crimson foliage ever seen on any tree. Fruit good." On the first page of this list, alas! was this notice: "These will never be offered again, as I shall discontinue the nursery business."

¹ If you have your own orchard and want to try some of the Burbank plums you can get the trees of some of his best varieties (Gold, Early Gold, Santa Rosa, and Indian Blood-Duarte) from Stark Brothers at Louisiana, Missouri. Burbank himself sends no trees East. There are ten varieties of "red inside" plums, all of them graduates of the Burbank Academy.

CHAPTER XXII. COMMERCIAL VALUE OF BURBANK'S NEW CREATIONS

“**S**HE has about as much expression in her face as a potato,” a famous prima donna once said to me in regard to another opera singer whose voice was more remarkable than her intelligence.

The romantic story of how Luther Burbank was helped by a potato ball to create a new epoch not only in potatodom, but in horticulture in general, has often been told, but usually incorrectly. My brief version of it is based on his own words. When he was a young man, living in Lancaster, Massachusetts (where he was born in 1849), he one day found in his patch of Early Rose potatoes a single seed ball. Such balls were at that time still frequent on other kinds of potato vines, but rare on the “advanced” Early Rose. He kept an eye on it, but when about ripe to pick, it suddenly disappeared; fortunately, after careful search, he found it some distance away. There were twenty-six seeds in this ball; all but three of them came up, and a few months later, when he dug the tubers, those in each of the twenty-three hills all differed from those in the other hills; for potatoes, like apples, very seldom come true from seed. Some of the new tubers were “all eyes,” others had enormous eyebrows or pro-

duced too many small tubers, or had rough skins or an undesirable shape, and so on.

There were, however, two honorable exceptions, and these were destined to create the new epoch in the potato world. These tubers were superior to the parent, and superior to any variety then known; they were larger, whiter, more uniform in size, had a better flavor, and proved to be more productive as well as better able to resist disease. They were planted the following spring and became the ancestors of the Burbank potato, of which California alone now grows over seven million bushels a year.

Burbank himself—such is the usual fate of inventors and discoverers—got only one hundred and fifty dollars for giving the world the best potato it has ever had. He modestly thought it worth five hundred dollars, but the first dealer to whom it was offered declined it curtly and so he was glad to accept one hundred and fifty dollars from another dealer; it was just enough for buying a ticket to California.

He had "tasted blood"; the results achieved with the potato ball and some other minor successes gave him so much joy that he resolved to become a plant breeder; not, however, in bleak New England, but in our glorious semi-tropical state where nature would be his ally; the state where Australian gum trees reach a height of seventy-five feet in five years; where fuchsias climb to the window sills of the second

story; where geraniums and veronicas in the front yard are not bushes, but trees. Little did he dream, when he crossed the continent in 1875, that he was destined to out-California California; that he would have gardens there after seeing which the most distinguished botanist and plant breeder of Europe, Prof. Hugo de Vries of Amsterdam, would write that "the flowers and fruits of California are less wonderful than the flowers and fruits which Mr. Burbank has made"; that "Luther Burbank is the greatest breeder of plants the world has ever known"; and that "the magnitude of his work excels everything that was ever done before, even by large firms in the course of generations."

While the California climate helped to bring about such an astonishing result, Luther Burbank's horticultural genius and his infinite capacity for taking pains were the prime factors in his success. He purchased a four-acre place in Santa Rosa, about fifty miles north of San Francisco. The land was "about as poor as could be found"; it had been the bottom of a pond. He drained it with tiles, and then, he relates, "as manure was cheap near by, I had eighteen hundred loads of it put on the four acres." Thus this very poor land, which nobody had wanted, was transformed into the earth's chief garden spot; nowhere else in this wide world could you find another four-acre patch on which so many historic garden events have taken

place. In 1885 he added a plot of land at Sebastopol, eight miles from Santa Rosa; this was larger—eighteen acres—and has been used ever since as testing ground for trees and flowers and vegetables. He chose this spot because it provided a variety of soils and degrees of moisture. In the dry California climate it was a tremendous advantage to have garden and orchard land some parts of which “are so moist that the water seeps up to the surface throughout the season, and the remainder is so loose and friable that moisture may be found all through the summer even six months after rain has fallen upon it.”

There were plant breeders, especially in Oriental countries, centuries before this American harnessed his twenty-two acres at Santa Rosa and Sebastopol, but W. S. Harwood, who wrote a valuable book on Burbank's *New Creations in Plant Life*, did not claim too much when he said that “not all the plant breeders who have preceded or accompanied him have done so much for the world.” That was twenty years ago, and in the meantime the output of novelties has been doubled, trebled, quintupled, and today, after passing the threescore-and-ten age, the wonder worker is busier and more beneficent than ever.

A BIRD'S-EYE VIEW

Just now [Mr. Burbank wrote to me on September 11, 1920] I have something between five and six thousand

experiments on hand, and I am raising plants for improvement from my collectors all over the world. Just now I find my most interesting plants are collected by the Guanaco Indians under the guidance of missionaries in Paraguay, which has a climate somewhat similar to ours, and the plant life there is less known to the civilized world than that of any other part of the globe. I am also receiving seeds of many new wild plants from Chile, Patagonia, Peru, Central America, Mexico, western China, the Himalayas, Alaska, Australia, Africa, New Zealand, and other countries. Not one in fifty of the plants raised from these wild native seeds is worthy of special care, but some of them are of priceless value in the production of new varieties of fruits, grains, grasses, trees, and flowers.

During the war my work was mostly for grains. The "quality" wheat which I sent out has 15 per cent of gluten—I think the highest in this important element of any wheat ever produced. It is a *white* wheat, in some respects much like the Marquis which is so extensively grown in British America, and grows everywhere from Saskatchewan, in the north, to Van Diemen's Land, in the south, ripening its crop much before other varieties, so that it escapes rust and many other diseases which shorten the crop of wheat in the United States. It took first prize over all other wheats in Canada last season—96 per cent perfect of a possible 100.

I have also a great number of experiments with rye, oats, barley, and some new grains; will have another new tomato to offer soon, and plums, grapes, chestnuts, berries, forest and shade trees, and flowers and fruits without number.

An interesting glimpse of the activities of a man of seventy-two! How can he do it? Of course he has plenty of helpers, but every

experiment is personally guided by his master mind. "Such a knowledge of nature and such ability to handle plant life would be possible only to one possessing genius of a high order," wrote Professor de Vries, after visiting Burbank. He recognized at once wherein Burbank differed from his predecessors and contemporaries. They had all worked on a much smaller scale, a few experiments at a time, while he supervised thousands at a time and most of them on a vast scale that no one had ever dreamed of before.

When you have one hundred thousand plants of one kind to select from, the chance of finding what you want is just one thousand times greater than if you have only one hundred plants. Burbank has sometimes had several hundred thousand of one kind at a time—lilies, poppies, plum trees, and so on; and when he had selected the individual plants that came nearest his ideal he had the others pulled out and made a bonfire of. In a single year he has had as many as fourteen of these bonfires, some of which consumed plants that, at nurseryman's prices, were worth up to ten thousand dollars. He had no time or room to bother with them.

SAVING SPACE, TIME, AND MONEY

One of his ingenious ways to save space, time, and money is grafting a number of varieties on a single tree. Grafting a few varieties of fruit

on a tree of another variety—say a Red Astrachan on a Baldwin apple tree—had been practiced for generations, but it remained for Burbank to graft five hundred and more varieties of cherries or plums on a single tree; and by not only short-cutting through grafting, but short-cutting grafting itself, as explained in his books, he has been able to produce fruit five or six years sooner than by nature's usual process—surely a stroke of horticultural genius, which, once widely applied, will prove of tremendous practical, commercial value. Had the five hundred kinds of cherries he had on one tree all been grown separately, and the same with the five hundred kinds of plums, he would have had to find room and food and care for a thousand trees instead of for two only. And think of the greater convenience of his way for comparison and selection for size, color, flavor, and other qualities desired in fruit!

In the letter from which I have just cited a few paragraphs, Mr. Burbank refers to the seeds he is receiving from all parts of the world. Therein lies another of the secrets which explain why he has been able to do more in the way of creating new or improved fruits, flowers, vegetables, and trees than all other plant breeders of the past and present combined. The United States Government's Bureau of Plant Industry has done splendid work in introducing Russian durum or macaroni wheat, Egyptian cotton,

drought-resisting Siberian alfalfa, and other useful products of foreign lands; but no one individual has ever imported foreign seeds of the aforementioned great value so largely as Burbank or so persistently and with such instinctive knowledge. Nor has anyone ever hybridized, or intermarried, so many wild plants with cultivated ones of many countries, thus giving the new varieties the greater health and richer flavor of the wild ones, combined with the greater size, finer texture, and superior sweetness of the cultivated kinds. Burbank's twelve volumes—a most fascinating autobiography—are replete with details on this subject.

BONFIRES AND MORAL CHARACTER

Regarding Burbank's bonfires I want to say a few more words. I remarked that he had no room or time to bother about the rejected plants. But why didn't he sell them? Many of them had points of superiority to the average stock and would have been eagerly bought by nurserymen. Take the case of fifteen hundred gladiolus bulbs which he deliberately destroyed, though they had an easy market value of a dollar apiece. Let the great plant educator answer in his own words: "It is better to run the risk of losing a perfected product, through the destruction of the elements which went into it, than to issue forth to the world a lot of second bests which have within them the power of self-per-

petuation and multiplication, and which, if we do not destroy them now, will clutter the earth with inferiority or with mediocrity."

These costly bonfires thus throw light on Luther Burbank's moral character. He needs money—lots of money—for his many costly experiments; but he is not willing to make any of it by selling products that fall short of his highest ideals and that might disappoint those who expect only the best from him. Imagine how such a man must suffer from the dishonest practices of some scoundrelly seedsmen and nurserymen who attach his name to inferior plants, seeds, and trees that have no Burbank blood in them at all. There is real pathos in the short paragraph on this subject printed in his 1920 catalogue of new creations in seeds: "A good name is a treasure for unprincipled dealers to trade on; tons of seeds and thousands of trees and plants of uncertain value are sold over my name throughout America each season. There is no redress."

No redress for the harm done to his name by these scoundrels! A few years ago I was visiting a famous prima donna whose husband had large and beautiful gardens and nurseries. When I asked the head gardener if he had any of the Burbank novelties he passionately responded that he had none; he had "tried some, but had found them worthless."

"Did you buy them from Burbank himself?"

I asked, and he answered: "No; got 'em in New York."

He had been fooled; he knew nothing about Burbank's moral character and high business principles; yet here he was, abusively biased against one of the most honest men that ever lived, because somebody else had cheated him!

Another class of persons who speak disrespectfully of Burbank are those who expected so much of his seeds that they thought these must do wonders under any and all conditions. Now the great plant breeder has achieved many surprising feats resembling miracles, but he has not been able to do away with the laws of nature. If you buy a fifty-cent packet of the choicest pansy seeds and plant them in a sunny bed with poor soil and no water they will produce flowers smaller and less beautiful than those you can get from a five-cent packet of ordinary pansies in rich soil with afternoon shade and plenty of moisture.

One day in September I saw a Burbank Shirley poppy plant grown from a seed that had been accidentally dropped on the lawn near my poppy bed. It had been mowed down repeatedly, and when it finally bloomed it was six inches high and the flower no larger than a nickel. Two feet away, in the cultivated bed, Burbank poppies from the same seed packet grew to a height of three feet, with flowers five or six inches across.

A GARDENER OF A NEW KIND

Being a man of genius, Luther Burbank has to suffer the usual fate of the truly great. Most professional pianists and violinists speak with jealous contempt of Paderewski and Fritz Kreisler. In the same way some of the men who are paid by the government to produce new and improved plants or trees in the United States experiment stations—which few of them ever do—never fail to give Burbank a slam where it is possible to work one in edgeways, or “damn with faint praise.” I happen to know that some of these men have asked Burbank to write essays for them in order to permit them to hold down their positions!

An amusing illustration of the professional, academic attitude toward “mere genius” occurs in Professor Bailey’s otherwise excellent book on *Plant Breeding*. There is, of course, a chapter about Burbank—that couldn’t be avoided. The professor admits that Burbank “stands alone.” He is a “gardener of a new kind”; he stands for a “great new idea in American horticulture”; he has demonstrated that plants can be made to do the most surprising things; his work is “a contribution to the satisfaction of living and is beyond all price.”

Nothing could be truer. But the professor also says: “Usually I think of him as a plant lover rather than plant breeder. It is of little consequence to me whether he produces good

commercial varieties or not." The number of "really useful things that have been introduced by Burbank is proportionally small." And then he has a chapter pointedly headed "A Practical Plant Breeder," which is devoted to the man who gave the world several new varieties of beans and took the string out of pod beans.

No one has rejoiced more than I at Calvin N. Keeney's clever feat of removing the annoying and indigestible string from pod beans, but Burbank's experimental gardens have given the world a hundred improvements and novelties of as great and much greater "practical" and commercial value. In justice to Professor Bailey it should be added that he wrote the book referred to nearly two decades ago. At that time only a few of Burbank's new or improved vegetables and fruits had got into the markets. He has added a great many since that time; but, as he himself has frequently pointed out, it usually takes from ten to twenty years to introduce a new variety to the public, however obvious its merits. "It is far less difficult," he writes, "to produce a valuable new plant than to convince the public of its value."

In food matters the public is singularly conservative and slow to move. My main object in writing this chapter is to exhort the American public to wake up to a full realization of how much Luther Burbank has added to the available

pleasures of life and the opportunities for making fortunes. To give a full list would make this chapter too much like a catalogue; so I will call attention to only a few of the most important novelties.

It is time to stop talking about this man's wizardlike but impractical feats, such as growing potatoes on tomato vines or producing an apple sour on one side, sweet on the other. Scientifically such things are tremendously interesting and important, showing that almost anything can be done with fruits and plants, and opening up brilliant vistas of future achievements; but what we want to do *now* is to help Burbank, while he is still with us, to banish mediocrity from our orchards and gardens by enriching them with the numerous products of his creative genius and his passion for the best only.

Burbank seems inclined to think that the most interesting of his fruits is the stoneless plum. One of the proudest moments in his life was when a visitor, a famous pomologist, cut into one of these plums and, to his utter bewilderment, found it had no pit. Removing the stone was not only a master stroke of horticultural ingenuity and perseverance, but it has tremendous commercial importance. The time will come, he believes, when all the plums that come into our markets will be stoneless; his hybrids of this novelty already represent almost

every color of the plum, varying in size and quality, and ripening from June to November.

Not only is a plum without stone pleasanter to eat, but—what is of tremendous commercial importance—a tree bearing stoneless plums will yield almost twice as much fruit because of the saving of the energy previously wasted on growing pits. Along this line Burbank's example is bound to revolutionize stone-fruit growing. It will take many years to do this; in the meantime let us exert pressure on the orchardists and marketmen to let us enjoy the best of the Burbank plums (twenty-seven varieties of them were shipped East last year—over a million crates, or fifty million pounds) instead of tolerating flavorless trash such as we usually have to put up with. One of the surprising Burbank plums is called the Bartlett. This, he says, "is so much superior to the Bartlett pear in its own peculiar flavor and fragrance that no one would choose the pear if the plum were at hand."

Last autumn I received from Mr. Burbank a box of delicious prunes, larger and sweeter than any French prunes I have ever tasted, with a letter dated September 13th, which I will cite because it illustrates the epicurean side of his genius, without which he could not have made his new fruits so superior to others in flavor:

As you are the acknowledged champion and leading exponent of the science of fragrance and flavor in foods,

I take pleasure in sending you by this mail a sample of my new "Standard" prune, just as we dry them in the sun, without any processing of any kind except to split the fruit and shake out the wholly *freestone* seed.

This, like all California fruit, should be quickly rinsed in cold water, then allowed to stand in cold water at least twelve hours in just enough water to cover them, then heated to nearly the boiling point for an hour or so, but *never boiled*. All dried fruit of every nature should receive this treatment to obtain the best flavor.

The flesh and flavor of many other fruits—peaches, apples, cherries, apricots, quinces, papaws—have been improved in Burbank's gardens. Of particular interest and practical value are his quinces and papaws. For thousands of years the quince had been neglected and it was still half wild when he undertook to educate it. His improved Van Deman quince received the Wilder Medal of the American Pomological Society in Washington as long ago as 1891. In California this profitable new variety sometimes yields three crops in one season. More recently he has created a better variety still, the Pineapple quince, which can be eaten out of hand, like an apple—fulfilling, at last, the desire of all lovers of this richly flavored fruit. Then came the "Burbank" quince, which adds to the merits of its predecessors the absence of wool. He has grown bushlike quince trees scarcely waist high, yet almost breaking under the weight of the fruit! To the papaw, which,

thanks to Burbank, is likely to be, twenty years hence, as important a commercial asset as plums or cherries, I shall devote a special chapter.

CHERRIES AND BERRIES

Much attention has been given at Santa Rosa to making the cherry more luscious and profitable. The Burbank, the Abundance, the Giant, and others combine the best qualities of many carefully chosen ancestors. (Would that human beings could thus have their ancestors chosen for them!) Burbank's cherries are bigger, sweeter, earlier in spring as well as later in the autumn, more sure to bear a crop, and—most important of all from a commercial point of view—he has educated the cherry trees in his orchard to grow in such a way that the leaves protect the fruit from bird robbers, while the dense foliage at the same time keeps off the rain and prevents the cracking by which millions of pounds of cherries have heretofore been ruined for the market.

In the berry patch, Burbank has been as busy a "practical" worker as in the orchard, providing opportunities for the making of many fortunes the country over. It is an old joke that "blackberries are green when they are red." The wags can now add, "and when they are ripe they are white," for Burbank has a luscious new white blackberry. That he has removed the thorns from the blackberry vines, making them

as smooth as ferns, is known to everybody, and pickers bless him for it. Most people, too, have read about his phenomenal berry, but few know what a big thing (it is the largest berry known) and what a luscious morsel he has made of it after twenty-four years of steady improvement. It is even finer than the loganberry which has won so much favor the last few years and which it is now displacing; it combines the blood of the red and yellow raspberries and the California dewberry.

The neglected and despised elderberries have been ennobled and made commercially valuable at Santa Rosa, where their bitter quality has been removed. They grow in "any old arid place"; they can be dried like grapes and they make excellent pies—that is, Burbank's improved variety does. But pie eaters have the surprise of their lives when they get acquainted with his new sunberry. A well-known professor who is also a gardener wrote to him: "Without exception I place a sunberry pie at the head of the pie list, and I do this with a full appreciation of the excellence of cherry pie, apple pie, pumpkin pie, mince pie, berry pie, etc." In view of America's boundless appetite for pie, Burbank was altogether too conservative when he wrote that "a dozen large packing firms could be profitably employed in canning this fruit for two or three months each season." The sunberry thrives in any climate and yields

twenty-five to forty thousand pounds per acre.

Pie plant *par excellence* in America has been rhubarb. Burbank has created a Giant Perpetual rhubarb which yields enormous juicy stalks in winter as well as in summer, except in the frozen soil of the north. Elsewhere it has become so profitable that it has become known as "the mortgage lifter." Another vegetable the commercial value of which has been immensely improved at Santa Rosa is the French (or globe) artichoke. It has been made much larger, more succulent, and richer in flavor. The French artichoke, with its delicious *fond*, is among salads what terrapin is among meats. I am eagerly looking for a gardener who wants to get rich by flooding Eastern markets with Burbank giant artichokes, driving out the small, dry, insipid things we have to put up with now. And surely there is "big money" coming to those wise enough to grow Burbank's Elephant garlic and Giant chives, which are from ten to fifteen times as large as the common chives and garlic.

"No other man has given to horticulture so many valuable things as has Luther Burbank," says Prof. E. J. Wickson, dean of the Department of Agriculture of the University of California, corroborating the words of Pres. David Starr Jordan of the Leland Stanford University: "Luther Burbank is the greatest originator of

new and valuable forms of plant life of this or any other age." In an address before the House of Representatives at Washington, the Hon. Everis A. Hayes said: "Ninety-five per cent of the plums shipped out of California, for example, are of the varieties originated by Mr. Burbank. Practically all of the potatoes raised and marketed in our state are Burbank seedlings, unquestionably the best potatoes ever produced in the world."

It is of particular interest to note that of the three most prominent American contributions to commercial plant life—potatoes, corn, and tobacco—two have been perfected through the labors of this gardener. In tobacco he is not interested, smokers will be sorry to hear; but one of his floral curiosities is a hybrid of the tobacco and petunia plants, "a very curious plant which combined the characteristics of both parents. Burbank named it the *Nicotunia*. It was facetiously described as a petunia that had acquired the tobacco habit."

Corn is entirely a product of human horticultural sagacity. Burbank did not create it; he did not even originate the sweetest and now most popular of all varieties of table corn, the Golden Bantam; but he has greatly enlarged it and made it far more profitable to grow and can than the original by increasing the number of rows on each cob from eight rows to twelve and more. Do you realize what that means? It has

been figured that if a single kernel were added to every ear grown in this country it would add over five million extra bushels of corn to the nation's annual harvest, without extra cost or labor. He has added not one, but one hundred, kernels to each ear of the Bantam corn!

Commercially speaking, the most astonishing products of the Santa Rosa and Sebastopol plant schools are perhaps the spineless cactus—transformed from a “vegetable porcupine” to slabs as smooth as a watermelon—and the royal walnut tree. From half an acre Burbank had one year five hundred *tons* of cactus forage—a forage which at Los Banos, California, increased the cows' milk flow 75 per cent over the amount when fed on dry alfalfa hay. A tremendous future also awaits his improved cactus fruits, of which there are many kinds varying in flavor, like apples or pears. As “fillers” far better than most of those now used they will be eaten in billions of American pies. Is it a wonder that Burbank has said that his improved spineless cactus “is worth more than the Burbank potatoes and all my other productions combined”? As for the Royal walnut, a single tree has yielded in one year forty-five bushels of nuts in the husk. But that is only a detail in its commercial value. It grows nearly as fast as the Australian eucalyptus, requires no care, and yields timber in all respects superior to that of the common black walnut, which is

worth up to eight hundred dollars per thousand feet.

MONEY VALUE OF IMPROVED FLOWERS

While Luther Burbank has thus contributed to the wealth of nations as few men ever have, he is at the same time, and above all things, an artist. I might devote several pages to the change "into something rich and strange" he has brought about in daisies, poppies, roses, gladioli, dahlias, lilies, and dozens of other flowers, enhancing thereby their commercial value in proportion to their greater beauty of form and color and their more delectable fragrance, not to speak of the increased vigor and immunity to plant diseases! By way of showing the tremendous commercial possibilities in improved flowers let me repeat from the Preface a few lines from a letter written to me by Mr. Burbank:

Twenty years ago the carnation was thought to be about as nearly perfect as it could be made. On a visit to Long Island I told Mr. Charles W. Ward a simple thing which I had discovered regarding the carnation, and he told me, before he died here in California, many times, that he made considerably more than half a million dollars out of the carnation from my plan, as he used to say, "before the other fellows got on to it."

Theodore Roosevelt declared that "Mr. Burbank is a man who does things that are of much benefit to mankind and we should do all in our power to help him." Help him, that is, by not

waiting a decade or two before we discover his discoveries, as we have done heretofore. He is ahead of his time, far ahead, like most men of genius. Let us mobilize and try to catch up with him while he is still with us.

Burbankism is commercialism in a higher, futuristic sense—not the short-sighted commercialism which tries to compel the public to buy inferior things that are most immediately profitable to the dealers, but an enlightened commercialism which understands that if the public is provided and tempted with choice delicacies like Burbank's new creations it will buy twenty times as many vegetables and fruits and flowers as it does now. Is not that the very soul and apotheosis of commercialism, in the best sense of the word?

CHAPTER XXIII. JAPANESE BURBANKS AND MORNING-GLORIES

THE Japanese are the æsthetic nation *par excellence*; no doubt of that. With us devotion to beauty is individual and exceptional; with them it is national—a great moral force like religious devotion. Imagine Americans getting up, as the Japanese do, to attend five-o'clock garden parties to see the morning-glories in all their glory!

To be sure, there are morning-glories and morning-glories. We think ours, as they climb up on strings and show their red, white, and blue blossoms, are pretty, and so they are. To a Japanese they seem "little wild things, like weeds, not beautiful or worth growing"; and so think those Americans who have seen the asagao, especially in their sublimated stages of *owa* and *fukurin*.

Everybody knows how much more beautiful the Japanese iris and the Japanese chrysanthemums are than any varieties of these flowers we have produced. But the Japanese flower of flowers is the morning-glory; not the lovely thing our seedsmen sell under that name—a great improvement on our common varieties—but something infinitely more lovely, varied, and ethereal; morning-glories worthy of the poetic names bestowed on them, such as Frozen Moonlight, Tuji's Snows, Foam of the Sea,

Dragon's Spume, White Cascade, Hoar Frost, Full Moon. Countless poems have been written on them, artists have perpetuated them on vases and paintings, and they are a national cult.

We are proud of our Burbanks and Eckfords and Bugnots who have done such marvelous things with flowers, enhancing their beauty a hundredfold and creating new varieties undreamed of before; but Japan had Burbanks by the dozen long before our miracle worker was born. You can read about them in Eliza Ruhamah Scidmore's article on "The Wonderful Morning-glories of Japan" in the *Century Magazine* (December, 1897).

The asagao was brought to Japan with the Buddhist religion, to become a sort of religious rite in itself. In course of time the native Burbanks expanded it to several times its original size. At the time of Commodore Perry's visit, which opened Japan to the world, princes, priests, nobles, hatamoto, and gardeners were all engaged in a mad rivalry to improve the morning-glory. Plants were sold at fabulous prices, fourteen and even eighteen dollars being paid for a single seed. Then the cult subsided for a while, till twenty years ago, when it became the midsummer craze of both masses and classes, asagao clubs being formed in Tokyo, Osaka, Yokohama, and Kyoto.

When Burbank made "tomatoes" grow on potato plants and that sort of thing, he followed

Japanese models. They made morning-glories grow from grape and potato vines, from chrysanthemum stalks and from rose bushes. They changed the form of the stems at will and gave them various colors. The leaves were made to mock those of the maple and other trees. And the flowers! There were *owas* of three, five, and even seven different colors, grown on one short vine of as many branches. On the *fukurins* such fantastic flowers grew "that one wonders how they can be morning-glories at all. They look like double poppies and pelargoniums; like carnations, honeysuckles, thistles, tuberoses, gardenias, chrysanthemums, columbines, upines, dwarf peonies, double irises, butterfly-and-pitcher plants; like orchids; like anything and everything but a morning-glory."

It is well for us occasionally to look at the Mikado's subjects from other than military and commercial points of view. In the subtle arts of refined enjoyment they are centuries ahead of us.

CHAPTER XXIV. MUST WE RAISE OUR OWN FRUITS, TOO?

THE drys have gained a great victory in the fruit markets. I have always been very fond of dried sour cherries, but until recently I had difficulty in finding any. In 1920 the grocers had barrels of them; samples were prominently exhibited in the windows, on which was pasted the mysterious legend, "Make Your Own."

Why should I make my own dried cherries when I can now buy them everywhere? Grocers are so enigmatic!

We also read of imported dried currants they had received, and of raisins, which suddenly came into such surprising demand that the California growers ceased advertising them and clamoring for "raisin weeks." "Make your own," the grocers advise us when exhibiting any of these dried fruits. It puzzles me very much. Why did raisins cost three times as much as they had formerly?

By an absurd association of ideas which I cannot account for, I am wondering if this victory of the drys will pull us back to the time when all fruit was grown and sold chiefly for tipping purposes. Fruit growing in America, a historian tells us,¹

¹ See U. P. Hedrick's huge but splendid book, *The Peaches of New York*. Albany, J. B. Lyon Co., 1917. Read particularly the remarks on Elberta peaches.

had its beginning, and for two hundred years had almost its sole sustenance, in the demand for strong drink. This is shown in almost every page of the agricultural literature of the times and in the laws of the Colonies restricting prices and levying taxes on liquors made from fruits. Peaches were grown in quantities wherever they could be made to succeed in the Colonies, not for the fruit itself, but for the making of peach vinegar (a sort of cider) and peach brandy (a distilled liquor). And so with other fruits.

TIME MAY SWING BACK

Will prohibition have the paradoxical result of bringing back this situation—of turning all our delicious fruit into booze? It looks that way. Grapes have been scarce; the why is answered by the presses for sale in shops and on the sidewalks, and the invitation to “make your own grape juice.” The California vineyardists who were in a panic when prohibition suddenly swooped down on them now wear smiles on their faces that never come off. They have doubled their income and are going to erect a monument to Anderson. In a few years, perhaps, such a thing as browsing in fruit marts will be a thing of the past. Therefore, for the benefit of future historians of the manners and customs of Americans in the year 1920 I submit a few remarks on what was to be seen in our markets and streets in that year. For convenience I shall use the present tense.

Mediocrity prevails in the fruit world as

everywhere else. The pretty but insipid Ben Davis apple is craftily sold under half a dozen names all over the United States. I saw a ray of hope last summer when I read a poster in a village post office in Maine offering prizes up to two hundred dollars to farmers starting young orchards, any variety being allowed—"except Ben Davis." The Ben Davis has become an outcast simply because it has no flavor.¹

The peach market also has its Ben Davis. Its name is Elberta. A few dense fruit-stand men still have the audacity to label their peaches Elbertas, as if that were something to boast of. Most of them, however, just placard them as "free-stone peaches." I asked one of them, "What are these?"

"Peaches," he answered.

"Yes, I know, but what kind of peaches?"

"Free-stone," he answered; and that was all I could get out of him without subjecting him to the third degree.

Another man, after a moment's hesitation, said, "Elbertas," and when I moved away saying I didn't want any Elbertas he muttered an oath to himself. Perhaps he will realize some day that he would make a great deal more

¹ Please call your fruitman's attention to this eloquent fact. For many other equally striking facts that will help to convince him see the chapter on the "Commercial Value of Flavor" in my book *Food and Flavor* (The Century Co.).

money if he bought and sold peaches that are fit to eat. Only once after returning from Maine, on October 17th, did I see edible peaches on the stands. They were Morris Whites, and I owed them to an epicurean managing editor who told me where to go for them.

PEACHES OF OTHER DAYS

Oh, for the good old times when the pushcart men had the freedom of the streets and offered loads of deliciously flavored and really "peachy" white peaches for sale everywhere, at two or three for a nickel! Where are the Crawfords and the Champions and the Admiral Deweys and the Kalamazoo and the other flavory varieties that would delight our palates? Why does not some wealthy gastronome offer prizes for peach orchards without Elbertas?

"I think very few peach growers would plant this variety for their own use," says a writer in the *Country Gentleman*. Like those wooden hams and nutmegs, Elbertas are "made to sell" and the foolish public allows itself to be "sold," by this Chinese apology for a real peach. "Being large yellow peaches, the buyers in the cities pay fancy prices for them" and they have become the leading commercial peach in America!

The Ben Davis among the grapes in our markets to-day is the Concord, which is sold in huge quantities, other Eastern grapes being a

mere sideshow.¹ If you get a *good* basket of Concords they are almost sure to be some other dark kind stupidly offered under that name. I remember the time when Concords seemed good to eat. Now there is still a sweet juice right under the skin, but the pulp is rubbery and sour as a wild crab apple. Epicures would gladly pay fancy prices for the Worden, a seedling of the Concord and a great improvement on it. It is sweet before it becomes quite ripe, which is a great advantage in these days when fruit is seldom tree or vine ripened, as it must be to be at its best. Other grapes of the Concord type, but much better, are Campbell Early, Stark Eclipse, and Moore Early.

The best Eastern grapes to be found in the markets are the Niagaras, which when good are very good, and the Delawares—"small, but, oh my!" They are usually rather scarce, and late in the autumn the fruit sellers try to make you buy—if they think you don't know much—the Catawbas, which resemble them, but are not so luscious. Of the California grapes offered, the best by far are the Muscatels. Unfortunately, they do not keep well and are therefore very

¹ William Harper Dean states, in the *Country Gentleman*, that "in New York, Michigan, and Ohio there are some ninety thousand acres in vineyards, 90 per cent of which are devoted to Concords." Speaking of the present method of selling grapes, the manager of one company said: "It puts a premium on poor stuff and discourages the man who spends time and money to put quality into his product." That's why it takes ten to twenty years to introduce Burbank's improved varieties.

expensive. I have paid three dollars for a six-pound basket. They disappear early, but if you want to buy a basket of Malagas, which resemble them, and call them Muscatels, some dealers will gladly accept a triple price for them. Of the California grapes on sale everywhere, the Cornichons have the richest flavor. But give me Muscatels for flavor every time—or Muscats, as many call them.

All these solid California grapes are of foreign origin. Their skins adhere to the pulp. American grapes have loose skins. All of them are in the matter of flavor capable of great improvement by future disciples of Burbank.

Vesey Street is the best street in New York for retail fruit sampling. It leads on one side to Washington Market and on the other to Washington Street, which for a dozen or more blocks northward is one continuous market for fruits and some vegetables, many of the side streets also being monopolized by the wholesalers. Here you pass piles of baskets of Concord grapes, dozens on tops of one another; ditto of oranges and grapefruit from California, Florida, Porto Rico; of Honeydew and Casaba melons, which would have ten times their present sale if they were not marketed before they are ripe; of salad plants; bags of onions diffusing an atmosphere which makes one dream of Venice or Naples; of apples and pears; and every fruit in season that you can think of.

Oranges and grapefruit are not at their best before Christmas, and the late Burbank plums are still missing in our stupid markets, so the outstanding fruits in the late autumn on Washington and Vesey Streets are apples and pears. It is gratifying to note that there is a growing tendency to label these two kinds of fruit, especially when they come from the far West. Retailers, of course, always know what they get from the wholesalers, but until lately they were not particularly anxious to pass on their information to the consumer. Too often the consumer's gastronomic education has been neglected; he looks upon the apple when it is red and thinks one is as good as another; but it isn't, any more than a copper coin is as good as a dime, or a silver dollar as good as a twenty-dollar gold piece.

There are quite as big differences between different kinds of apples and pears, and the public is gradually learning that fact, which explains why Gravenstein, Red Astrachan, McIntosh, Stayman Winesap, Jonathan, Spitzenberg, and other first-class apples, and Bartlett, Winternellis, Bosc, Anjou, and other good pears are now being labeled at some fruit stands—unfortunately, not always correctly. Be on your guard and make your fruiterer understand distinctly that you want no Ben Davis apples, Elberta peaches, or (genuine) Concord grapes. If he has any good black grapes, let him

give them their right name and make them popular.

Recent developments certainly do not allow us to view the fruit situation optimistically. Things are going from bad to worse. While not only Luther Burbank, but the other plant breeders, are using their brains to produce superior varieties of fruit, the marketmen, wholesale and retail, far from encouraging them, eliminate even from the varieties now in the markets those that are best. I foresee the time when those of us who want to eat first-class fruits will have to raise them ourselves, like our peas and beans and corn and tomatoes. When that time comes (it isn't very far off) those who can afford it can easily add a small orchard to their garden. The best varieties to plant for epicures—that is, for those who know good fruit from mediocre and bad—are named in the orchard chapter of a book to which I have already referred enthusiastically more than once—E. P. Powell's *The Country Home*.

THE BEST APPLES

Although that book was written two decades ago, it is quite up-to-date except in a few details. One of these is important. While recommending, among apples that should grow on every farm and country place, Red Astrachan, Yellow Transparent, Gravenstein, McIntosh, and Spitzenberg, he has nothing to say

about Stark's Delicious, which Burbank has pronounced the best of all apples (modestly forgetting his own Winterstein, Goldbridge, Crimson, improved Newtown Pippin) and the wonderfully flavored Stayman Winesap. These are recent additions to the list, which Mr. Powell could not have known of when he wrote that book.

In my opinion, the Stayman Winesap is the most flavorful and, in texture also, the most agreeable to eat of all winter apples, as the Red Astrachan is the finest summer apple and the Gravenstein the most deliciously fragrant and appetizing of fall apples. These three are *de rigueur* in every amateur's orchard. The Gravenstein is, especially when raised on the Pacific coast, so fragrant that a basket of it will perfume a whole house. Burbank's Winterstein is an improved descendant of the Gravenstein; it ripens later and thus prolongs its season most agreeably.

Concerning the Stayman Winesap, Stark Brothers' (Louisiana, Missouri) catalogue says, "The quality is indescribable; the flesh is juicy and crisp, with a mild and pleasing acidity and a flavor that has made it, in just a few years, one of the most-sought-for apples, and a general favorite on all the markets." Some of the Staymans weigh over a pound and measure fourteen inches in circumference, and a single tree has yielded twenty-two barrels in one crop—all of

which is fortunate for the consumer, because they endear this apple to the commercial grower and the dealer. The originator of this finest branch of the great Winesap family, Dr. J. Stayman, declared a quarter of a century ago, "There will come a time when all will want it." His prediction has come true. If you have been buying ordinary Winesaps by the dozen, you will buy Staymans by the box.

An attempt has been made to discredit the Red Astrachan as being a tardy and shy bearer, and inferior to another Russian summer apple, the Liveland Raspberry. I don't know that apple, but I doubt if it can have a flavor so unique and alluring as the Red Astrachan. In my experience this has been always the earliest first-class apple, and its flavor is such that a number of other red apples are smuggled into the market under its name; which makes it the direct opposite of the odious Ben Davis.

CHAPTER XXV. DO APPLES KEEP THE DOCTOR AWAY?

IT was bound to come; the worm has turned. A thousand times everybody has heard or read that an apple a day keeps the doctor away. Of course doctors don't want to be kept away; wherefore it is surprising how long they have silently endured this thrust and even encouraged the habit of eating apples and other fruit. But there is a limit to all things. At last a doctor has raised his voice to put a stop to this nonsense. William Henry Porter, M.D., has written a book, *Eating to Live Long*, in which he declares that the eating of fruit, especially in conjunction with the meals, as is commonly practiced in this country, is "one of the most pernicious and reprehensible of all dietetic follies."

The physician's profession is a paradox. He makes his living by curing people who are ill, yet he is expected to tell them how to live so as to avoid being ill. Can it be that Doctor Porter has unveiled an atrocious plot? Have the other doctors conspired to encourage fruit eating because it brings them patients afflicted with headache, neuralgia, neuritis, rheumatism, sciatica, lumbago, skin eruptions, diabetes, and Bright's disease, all of which, according to Doctor Porter, "have their origin in nothing more or less complex than the injudicious use of fruit and fruit acids"? Can it be possible that

the doctors have so patiently endured the taunt about apples keeping them away because they knew that apples were their best business friends?

THE FRUIT CURE

Linnæus, to be sure, cured his gout by means of the "cherry cure," and thousands have been restored to health by means of the "grape cure" popular in European countries for generations. Many physicians employ the fruit cure with excellent results, and at Battle Creek the "fruit regimen" is scientifically employed to cure the very evils which Doctor Porter attributes to fruit eating. He declares that fruit acid taken with other foods interferes with digestion, but the world's leading authority on the digestion of food, Professor Pavlov of Petrograd, has demonstrated by actual experiments that the acids of fruits stimulate the stomach to produce gastric acid and that these acids are able to a considerable degree to take the place of the natural acid of the stomach when this is absent.

Dr. J. H. Kellogg disagrees with the old maxim that fruit is gold in the morning, silver at noon, and lead at night; it is "golden all the time," he declares, and no one in this country is better posted than he on what goes on chemically in the alimentary canal. "Eat fruit freely every day, before breakfast and before dinner, and especially let your dietary include

cherries, apples, and grapes," says a noted French physician in a treatise on longevity.

Children do not need to be urged to eat fruit freely; they prefer it to everything except candy, and it is much better for them than candy. Adults too often get out of the habit of eating fruit freely; the consumption of it ought to be twenty times what it is now, and it would be that if the best varieties only were brought to market and the prices kept low.

Of course, eating too much fruit is bad—as bad as eating too much of anything. Fruit should be avoided in some diseases, and it does not agree with some healthy persons. Yet there is good reason for believing that even these persons would find it beneficial if they exercised care in avoiding the inferior and unripe.

ANOTHER BURBANK TRIUMPH

Pectic acid abounds in unripe fruit, and pectic acid, while necessary for jellying, is not desirable in fresh fruit. Some years ago a chemist wrote to Luther Burbank:

I have finished making an analysis of a number of your fruits and I find that pectic acid, which is apt to play havoc with the human digestive tract, and which accounts for the inability of many people to enjoy raw fruit, is almost entirely absent.

It would be difficult to overestimate the importance of this discovery.

Mr. Burbank had not consciously striven to eliminate the pectic acid; he had even added it freely in his wedding of wild plums and apples to some of the cultivated varieties; yet his principles of gustatory selection brought into being, after the lapse of some years, reformed fruits fitting the finicky stomachs which sedentary occupations are giving us.

Such improved fruits anybody can eat as freely as our simian cousins eat the hundreds of varieties of wild oranges in the Brazilian forests.

Among humans, oranges and apples have been found the best remedy for the widely prevalent acidosis, and it has been scientifically demonstrated that, next to milk, the juice of sweet oranges is the best food for infants and children. Even Doctor Porter admits that fruit taken without other food is all right—a hint to the many who are at present wondering what they should buy for their office lunches. With a few nuts thrown in, fruit makes a complete meal.

CHAPTER XXVI. WHY NOT GROW PAPAWS, AMERICA'S MOST DELICIOUS FRUIT?

“**E**ATEN by pigs and boys.” I shall never forget the surprise and indignation with which I read those five words in one of Prof. Asa Gray’s textbooks of botany, after his description of the May apple.

Although I left Missouri when I was eight years old, I remember well how we boys used to get ahead of the pigs by gathering these plum-shaped fruits and letting them ripen in the barn, buried in hay. Soon they became luscious beyond compare, a feast for epicures. I made up my mind, as I have related in *Food and Flavor*, that if adults do not relish this fruit they have something to learn from pigs and boys. What would the French do for truffles if the pigs did not locate them for them?

The American papaw (*Asimina triloba*) is another underrated fruit the merits of which my fresh childish palate promptly discovered. It grew wild on bushes near my Missouri home and I distinctly recall the thrills I got from its luscious, quasitropical, exotic flavor. I also remember how I was annoyed by the huge seeds, which crowded out just so much of the sweet pulp.

Then I lost track of the papaw. Often I wondered why none came to market in the cities

of either the Pacific or the Atlantic coast, where I lived for a time. Was Professor Bailey right when he wrote that most persons do not relish its flavor, and doubted whether it would be possible to awaken much interest in this fruit? Was it another case of "pigs and boys"? Evidently! For, in an encyclopædia for young people called *The American Educator* I found this, under "Papaw": "It is of no value for the table, but is enjoyed by birds"

This didn't convince me that I must be a bird, for I had previously read in that great book, *The Country Home*, by the horticultural epicure, E. P. Powell, "I see no reason why this delicious fruit, a sort of hardy banana, should not be grown everywhere in our gardens." And my belief in my epicurean precocity was fully justified when I found that Luther Burbank also must be a bird, as he enjoys his improved papaws more than any other fruit in his Sebastopol and Gold Ridge orchards.

Here is what, in response to my question, he wrote, under date of September 11, 1920:

The papaw which I am growing is a hardy papaw, and will thrive in New York State and possibly in Maine. No one, as far as I know, has succeeded in raising them from seeds except myself. I obtained some most delicious varieties of the fruit from Illinois, Indiana, and Tennessee, and have grown some wonderful seedlings from these, the fruit in flavor being much superior to the tropical "papaw," which is a totally distinct species, ours being the *Asimina triloba*. It is a common saying

that "the only way to make a papaw live is to try to kill it," as it is very hard to kill when once it gets fairly started. The flavor of the best varieties, in my opinion, is superior to that of any other fruit, and as they can be still further improved, the papaw will soon become a grand standard fruit in America, and will be cultivated like other fruits.

After reading this letter I made up my mind to become a missionary and preach the gospel of the American papaw. Hence this sermon.

STRANGE HABITS OF A QUEER PLANT

Can the American papaw be successfully grown in all our Northern states? That was the first question presenting itself. Mr. Powell says, "It will grow anywhere in our gardens, but it likes water, and if the season is dry the fruit will either drop or be flavorless, unless the trees are abundantly irrigated." On another page he says: "The papaw is as beautiful for the shrubbery as it is excellent for fruit. It likes moist soil, but can be grown on high soil by mulching."

My next step was to find out what the government experts had to say. In answer to a question addressed to the Bureau of Plant Industry in Washington, the pomologist, C. P. Close, wrote me the following letter, dated July 13, 1921:

The American, or native, papaw (*Asimina triloba*) is entirely distinct from the tropical fruit called papaya,

or tree papaw (*Carica papaya*). This last-named fruit is being grown in Florida and California.

The American papaw is native to probably all of the states east of the Mississippi River, except, perhaps, Wisconsin, and it is also found in the Middle Western states as far west as Kansas. The only attempt to propagate and improve papaw so far as I know has been made in Indiana. Several very fine papaws have been found in southern Indiana, and one of these was named a few years ago, but I think was never propagated by budding or grafting. I obtained seeds several years ago from southern Indiana, and grew a number of plants from them. When these plants fruited they produced rather small and inferior fruits. I have seen papaw trees in southern Indiana growing in back yards and producing fruits of very fine quality. There has been no systematic attempt to improve this fruit. A great difficulty is that the seeds are so large. If we could find fruits with small seeds it would certainly be worth while propagating. The best papaw that I ever sampled grew in western Maryland. This fruit does not have the digestive power which is attributed to the leaves of the tropical papaya.

THINKING IT OVER SIX MONTHS

Knowing what the writer of this letter evidently did not know, that a systematic attempt to improve the American papaw has been made by Luther Burbank, I wrote to him for further information. Under date of July 12, 1921, he replied:

The papaw has always been taken as a matter of course, apparently, by Americans. It is really the most unique fruit that America has ever produced, and seems to be one of nature's partial misfits in some respects,



as the seed is apparently not suited to grow well under any conditions. The seeds are very much larger than they need to be under any circumstances; it is very difficult to transplant one of them after the first season's growth, and is about, if not quite, the most difficult seed to germinate among the hundreds of thousands which I have tested, yet I have succeeded in producing about a thousand plants this year from my own selected seed.

The papaw is a very different plant from the tropical papaya; superior to it in flavor, in my opinion, but of course smaller and seedy compared with it. I think the hardier Northern varieties will grow in all the states of the Union, as it thrives in Illinois and my original stock came from that state mostly.

My method of germinating the seeds is to plant them in a mixture of turf and sand in the greenhouse in well-drained boxes, where, after six months of thinking it over, they begin to sprout. These are then transplanted to shaded beds outside, where they are grown for one year and then are sold for transplanting.

We send you our latest catalogue describing the papaw somewhat. Perhaps you may not have received it, as we do not solicit Eastern orders for *plants*, as our season makes it very difficult to *hold* the plants until spring opens.

In this catalogue I found a picture of six egg-shaped large papaws on a tray and this information:

One of the most difficult of all trees to raise from the seed and not offered elsewhere. The fruit is the size and form of a small banana and excels in flavor any known fruit which can be raised in temperate climates. I have never so far been able to raise enough trees to go around. The young trees grow very readily when of the small size which I offer.

No doubt the papaw's habit—as Mr. Burbank humorously puts it—of “thinking it over” six months in the greenhouse before it begins to sprout has a good deal to do with the neglect of this grand fruit. Now that he has shown how to overcome its apparent objection to being born, others can follow his example; and as his plants are not available in the Eastern states, I hope that some of our enterprising and ambitious greenhouse men will adopt the papaw and push it into the popularity which it deserves. The more of them who follow in the footsteps of this great gardener in doing in ten years of selection and hybridizing what nature might (or might not) have achieved in a thousand years, the better for everybody from the business point of view as well as the epicurean or gastronomic.

One of the questions I asked the U. S. Bureau of Plant Industry was whether the American papaw is at all like the tropical papaya in having in the juice of its fruit or in its leaves the chemical papain to which such wonderful digestive powers are attributed. Mr. Close answered this question in the negative. To get further expert testimony on this point I wrote to the great Battle Creek dietician, Dr. J. H. Kellogg; his answer was:

I have not forgotten to mention the American papaw in my new food book now in the press. I notice the Agricultural Department spells the name of the American fruit with one “w,” papaw, while the tropical fruit is

spelled with two "w's," pawpaw. It is the tropical fruit that has the digestive ferments in it; at least I have never heard that our Northern fruit has any digestive properties. I am not sure, however, that this subject has been scientifically studied. I will perhaps get a chance to investigate the matter this year. The papaw grows in Michigan quite abundantly in certain regions. We have a town a few miles west of Kalamazoo named Paw Paw because of the abundance of this fruit in that vicinity. No attention has been given to it, however, and it seems to be running out. Some attempt has been made to improve the fruit, with more or less success. It is an excellent fruit, almost the only fruit we have which has a real tropical flavor. The mandrake, or May apple, is the only other one. Both are good fruits and I think ought to be improved by culture. I believe they would be invaluable additions to our too limited list of fruits.

THE TROPICAL PAPAYA

The tropical papaya, which does contain the remarkably digestive papain (destined to supersede the ubiquitous soda mints), is not altogether un-American, since it grows in at least two of our states (Florida and California), while on our Hawaiian Islands it furnishes more enjoyment than any fruit except the banana. The natives revel in its luscious flavor; I have sometimes thought that the reason why the Hawaiians are usually represented as persistently cheerful and bubbling over with merriment is because the juice of the papaya, containing as it does papain in all its parts and

particularly in its fruit (see the *U. S. Dispensatory*) banishes dyspepsia, the chief source of ill health and melancholy.

Mrs. Jack London says in *Our Hawaii*: "Jack is wild about this fruit, and has it for every breakfast"—so it is not the natives alone who relish it. Let us by all means have in our markets the papaya in addition to the papaw. It is a native of Mexico, belongs to the passion-flower family, and is highly ornamental as well as useful. "For sheer beauty, in an artificial sense, it is the most remarkable tree we have ever seen," wrote Mrs. London, and she and Jack were great travelers.

David Fairchild, our government's explorer in charge of Foreign Seed and Plant Introduction, is so much interested in the papaya that he has issued a special pamphlet on it (to be had from the Superintendent of Documents in Washington), which will serve as a guide to those who may wish to grow papayas as well as papaws.

CHAPTER XXVII. THE RETIRED RICH NEED NOT DIE

IN France and Germany it was customary, before the war, for a man who had "made his pile" to become a *rentier*—that is, one who has retired from his office or professional work and just vegetates, enjoying the rest of his life in the pursuit of health, happiness, and some pet hobby. During my travels abroad I often came across men who had written "*rentier*" after their names in the Swiss and Italian hotel registers, and often I was surprised to see how young some of them were. Asked about this, one of them answered frankly that he saw no reason for remaining in the treadmill when his income allowed him to roam the world unfettered. "Besides," he added, "I wanted to give some one else a chance."

In America there are no idle rich. Every merchant, banker, doctor, lawyer, works like a steam engine pulling a freight train up the Rocky Mountains till his doctor cries his warning, "Stop or die." But, alas! When any of these men do retire, not having anything to occupy their minds, they are tormented by boredom, all their faculties become rusty, and in a year or two they die anyway. That is what we read every other day in medical and other newspapers. When rich men retire because of advancing age, we are assured, it is too late for

them to cultivate a taste for some easier, life-saving activity.

But there is *one* occupation which it is never too late to seek refuge in.

Gardening is certainly the next amusement to reading, and, as my sight will permit me little of that, I am glad to form a taste that can give me so much enjoyment and be the plaything of my age, now my pen and needle are almost useless to me. I am really as fond of my garden as a young author of his first play when it has been well received by the town.

So wrote Lady Mary Wortley Montagu to the Countess of Bute, to whom she eloquently describes her walks garnished with beds of flowers, her wild vines twisting to the tops of the highest trees, her little wood carpeted with violets and strawberries and inhabited by a nation of nightingales and game of all kinds.

HAVE A LITTLE GARDEN IN YOUR HOME

Men and women of America, if you wish to live long and be healthy and happy, follow the example of Lady Mary Wortley Montagu and make a garden the plaything of your advancing age. You will soon learn to enjoy it as a child enjoys its new toys; your boredom will vanish; life in the open will paint your cheeks red, give you a good appetite, and once more open your clogged senses to the beauties and enchantments of nature which you knew as a child, but had forgotten during the years when you were

shoveling superfluous dollars into your vaults. Start a garden next spring and in a few weeks I guarantee you will have an interest in it which soon will develop into a mania—a passion that will keep you alive, busy, absorbed, enchanted. It will add twenty years to your life.

To get a foretaste of the joys awaiting you next summer, go into some well-kept garden, see the autumn flowers, the dahlias, asters, hydrangeas, cosmoses, phloxes, gladioli, pansies, and many others, and then pass on to the rows of full-headed cabbage and salad plants, the salsify—safe substitute for the sewage-soaked oysters—the late carrots, beets, peas, the scarlet runner and other pole beans, and, above all, the corn and the pumpkins. I love to hide in a corn field, watch the broad, long leaves waving in the wind, and listen to their music. John Muir, in his great book on the mountains of California, dwells on a fact known only to those whose senses have been trained—that the leaves of different trees sound a music of their own as recognizable as the calls and songs of various birds.

The cornstalk, too, has its own call to the music lover. The pumpkin leaves are mute; but the pumpkins themselves—how picturesque they look between the cornstalks—green, yellow, orange, white—big and doubling in size every few days. And when I think of pumpkin pie—genuine, home-made, I mean, not the kind you

get in most restaurants—I—well, some feelings are too deep and complex for expression in words.

A SPORTING PROPOSITION

Let me say right here that if the retiring rich man, for whose special benefit I am writing this chapter, is interested in sports, he need not swear off when he becomes an amateur gardener. His professional assistant will tell him how he can raise mammoth pumpkins weighing up to a hundred and even two hundred pounds. He can try to make a new record in size and weight, beating all his neighbors and predecessors. Why isn't that just as satisfying as a new record in boat or horse racing?

The spirit of racing or emulation can be applied in a hundred ways in the garden, as I hinted and briefly illustrated in the chapter "A New Time-table for Vegetables." If you will read the books of Luther Burbank the gardening of the future will seem a wild dream of impossible possibilities.

You, the retiring rich man, are in a position also to contribute to the satisfaction of living things that are beyond all price. You can have a use for your wealth which will make your name memorable in the gardens and the parlors and dining rooms of the world. There is usually no money in this sort of thing. Speaking of Calvin N. Keeney, who originated the stringless beans, Professor Bailey says, "The making of new

kinds of beans pays only in the intellectual satisfaction of it and in the general standing that it gives the business." This is true of plant breeding in general, and that is why so little of it is done. As soon as the first of the new seeds are sold, anyone can raise and sell them; there is no patent or copyright and royalty. For this very reason such achievements as putting new colors or perfumes or details of shape into flowers and making vegetables earlier, bigger, and better flavored are peculiarly for wealthy persons who are ready to sell out and devote the rest of their lives to nobler tasks than money making. A single creation along this line may make you immortal. The joys of creative gardening certainly are as intense as those of authorship. Think of seeing on your grounds flowers that no one has ever seen; of tasting fruits or vegetables that no one ever enjoyed before! Is there anything else that brings us so near the Creator?

HEALTHY PLANTS RADIATE HAPPINESS

Even if you do not care to undertake such a task there are a thousand other delights of gardening awaiting you. Nor need this be purely a selfish indulgence. You can raise more flowers and tender vegetables than you need and send them daily to the hospitals, where your name will be blessed hourly. That will magnify your own pleasures just as a microscope en-

larges what you see. And your own eyes will become as microscopes; you will see as an artist sees, especially if you will rise early (five is not too early) to see the glories of the sunrise and clouds and listen to the glad song of the birds. Your plants at that hour look refreshed by sleep and dew; they radiate happiness which you will find contagious.

Before breakfast is the best time, too, to work in the garden. In midsummer my day's work in the sunshine ends at 8 A.M.

I make up for early rising by taking a half-hour Spanish siesta in the afternoon—a most refreshing custom. This half hour seems to equal two hours of night sleep. Why? I don't know. Of course, if you are not strong you must let your helpers do all the spading and hoeing, but surprisingly soon you will find yourself able to do some of the harder work, too. My little nephew and I (he is just sixty years younger than I am) do much of the potato digging. It's as good fun as fishing. You never know what's going to be at the other end of the vine you pull out.

Above all things, engage a head gardener who realizes that "the flower's the thing." Landscape gardening and drives and pergolas and shaded walks and summerhouses are all very fine things, but they will not give you the full benefits promised in this chapter through spending your days with the flowers and vegetables.

Wealthy families that have the landscape gardens without the flowers to cultivate personally are, in the words of Mrs. Theodore Thomas, "like those other unfortunates who occupy the opera box night after night without any knowledge or appreciation of music."

But a garden, you might say, is good only half a year. What are the retired rich to do the other six months? Go to California or Florida and have a winter garden! That's infinitely more conducive to longevity than rocking all day on a hotel piazza, bored to death.

CHAPTER XXVIII. THE JOYS OF CREATIVE GARDENING

PERHAPS it is a mistake to discourse in one brief volume on supergardening, as well as on ordinary gardening, but the conditions described in Chapters XXIV-XXVI are so discouraging that I cannot resist the temptation to add a few pages for the purpose of encouraging the retired rich (as well as others who want a life-prolonging hobby and have money enough to engage in creative gardening) to become amateur Burbanks, for the purpose of thwarting the vegetable and fruit men who are doing their best to eliminate variety and flavor, two things that make eating a source of health as well as of pleasure.

I have already intimated that the producing of new kinds of plants brings a man nearer the Creator than anything he can do; and the joy of creating is beyond all other pleasures. On page 181 I gave a glimpse of the happiness that comes to Luther Burbank from seeing his new ornamental or useful plants that human eyes had never before beheld. The following final pages of this book are intended to urge on others to share these pleasures of creating, by giving glimpses of the great plant breeder in his magic gardens, besides quoting some of his hints to those who may wish to follow in his footsteps.

“The amateur who enters this fascinating field

will do well," Burbank counsels, "to begin with simple cases, paying heed to a single quality of any flower or fruit with which he experiments; endeavoring to advance along one line till he gains skill enough through practice to attempt more complex experiments.

"Let him, for example, increase the perfume of some familiar garden plant or develop a race having large blossoms or one having peculiar brilliancy of color." One does not need to be rich to enjoy this kind of fun. An ordinary garden suffices.

"Any flower bed will show him," Burbank continues, "among different specimens of the same species, enough of variation to furnish material for his first selection. And he is almost sure to find encouragement through discovery, among the plants grown from this seed, of some that will show the particular quality he has in mind in a more pronounced degree than did the parent plant.

"So here he will have material for further selection, and step by step he can progress in successive seasons, often more rapidly than he had dared to hope, toward the production of the new variety at which he aims."

Here is another interesting hint. You can enjoy the pleasures of supergardening by putting alluring paint on pears. Hear the master: "Unlike most other fruits, this one, as everyone knows, is for the most part lacking in the

brilliant color that purchasers of fruit in the market usually find so attractive. But there is no reason why pears of various brilliant and attractive colors should not be developed just as colored apples have been."

In this sort of thing gardening with brains reaches its climax. And it gives you a chance to become famous.

"When you work with fruit trees you are making permanent records, reaching out your hand to future generations—erecting a monument that will remain long after you are gone."

The following four classes of plant improvements are suggested by the master gardener at Santa Rosa:

First, improving the quality of the product of existing plants.

Second, saving plants from their own extravagance, thereby increasing their yield.

Third, fitting plants more closely to conditions of soil, climate, and locality.

And fourth, transforming wild plants and making entirely new ones to take care of new wants, which are growing with surprising rapidity.

BEGGING FOR IMMEDIATE IMPROVEMENT

Along these lines supergardeners can find an endless variety of tasks to solve and endless joy in solving them.

Some plants, Burbank declares, are "begging for immediate improvement." Others have

already been vastly improved. Grapes, for example. "The grapes of our childhood grew sparsely on climbing vines which covered our arbors; while the grapes grown for profit to-day grow thickly, almost solidly, on stubby plants three feet or so in height. The value of the grape plant lies in the fruit and not in the vine."

Yet all the grapes except the Muscatel (or Muscat) call loudly for further improvement, especially in the matter of rich flavor. And the Muscatels need something, too—a thicker or tougher skin (we needn't eat it) to make them ship better. Give them such a skin—it can easily be done along Burbankian lines—and more of these deliciously flavored grapes will be sold in Eastern markets than of all other California grapes combined.

Seedless grapes are not among Burbank's achievements; they have been raised for more than a century. He is convinced, however, that these very small grapes can be doubled in size and improved in flavor by a certain cross suggested by him.

"Seedless raspberries, blackberries, gooseberries, currants, with the energy saved reinvested in added size or better flavor, call for some one to bring them about.

"Seedless figs, even, might be made, but these could be counted no improvement; for the seeds of the fig give the fruit its flavor."

Concerning orchard improvement Burbank says: "The fruit trees of our fathers and mothers were shade trees in size, with all too little fruit. The ideal orchard of to-day, generally speaking, is the one which can be picked without the use of a stepladder. Thus, already we have taught fruit-bearing plants economy—saved them the extravagance of making unnecessary wood at the expense of fruit, since it is their fruit, not their wood, that we want. . . . Skyscrapers in the orchard do not pay.

"In the case of the prune, in particular, a low-branching tree is especially to be desired, that the prunes may not be bruised in falling, for even as tough a fruit as the prune may be injured in falling from a tree.

"The stoneless plum points the way to a new world of fruits in which the stony or shell-like covering of the seeds has been bred away. . . . The coreless apple, pear, and quince, with sheathless seeds growing compactly near the top, out of the way—these are all within the range of accomplishment."

HOW WE IMPROVE ON NATURE

Again and again Burbank emphasizes in his writings the fact that there are no secrets about his method of improving plants or creating new kinds, and that he is simply accelerating the processes of nature as revealed by Darwin. Nature is too slow and does not always work for the

things we want most; hence the need of plant breeders, of systematic supergardening with brains. The following paragraph is illuminating:

“Nature has been carrying on selective world-wide breeding of plants and animals on a constantly widening scale for millions of years; but nature does not care for sweet corn, melons, Bartlett pears; luscious, juicy, fragrant peaches; large, early, sweet cherries; thin-skinned, seedless, juicy oranges; large grapes of many seasons, colors, and flavors; pineapples with their delightful aroma; prunes with sugar content sufficient to preserve them while drying; large, crisp cabbages; head lettuce; ‘Quality’ asparagus; self-blanching celery; double roses; varicolored carnations; cactus dahlias or wonderfully colored gladioli; cannas and lilacs with new perfumes and a beautiful range of splendid color effects; or the farmers’ crops of varied grains, and potatoes which now are, in most cases, at least, a hundred times as productive and of almost infinitely improved qualities.

“But man has, at first unconsciously and later consciously, produced all these marvelous improvements in everything, plant and animal, which is useful to him; not by nature’s method of selective breeding for the continuance of life at any cost, but for *definite purpose* to supply the world with food, clothing, shelter, and luxuries.” Read the chapter on “Planning a

New Plant" in Vol. II of the new Collier edition of his collected writings.

"I have been," he says on another page, "imbued from the very outset with the idea that inasmuch as existing plants have all evolved from inferior types, it should be possible to develop any or all of them still further."

And here is a trumpet call which ought to inspire and enthuse all those who may have a desire to do a little plant improving on their own account: "*Who can predict the result when the inventive genius of young America is turned toward this, the greatest of all fields of invention, as it is now turned toward mechanics and electricity?*"

THE ENEMIES OF GREAT MEN

All the quotations in the foregoing pages from Burbank's writings are made from the third, or 1915, edition in twelve large volumes, an *edition de luxe* in every way, but rather "long-winded," as he himself calls it in a letter to me. Few persons in our busy age have time to read and assimilate so many pages on any one topic.

As I am writing this chapter, there comes to me a set of the new Collier edition, in which the twelve volumes are cleverly condensed to eight; the material is also arranged in a more practical way, and all information brought up to date. The titles of the new volumes are: I, *Plant*

Breeding; II, Grafting and Budding; III, Fruit Improvement; IV, Small Fruits; V, Gardening; VI, Useful Plants; VII, Flowers; VIII, Trees, Biography, Index.

There are hundreds of useful colored pictures, with strikingly illuminating comments. Amateur plant improvers will eagerly read such chapters as "The Rivalry of Plants to Please Us," "Some Interesting Failures," "Letting the Bees Do Their Work," "A Rich Field for Work in the Textile Plants," "Useful Plants Which Repay Experiment," "What to Work for in Flowers," "Producing an Entirely New Color," "Growing Trees for Lumber," "Inedible Fruits Which May Be Transformed," "No Two Living Things Exactly Alike," etc.

The new edition also has a Preface by David Starr Jordan, president of the Leland Stanford University in California, in which he remarks that "big men are usually of simple, direct sincerity of character. These marks are found in Burbank, sweet, straightforward, unspoiled as a child, devoted to truth, never turning aside to seek fame or money or other personal reward. If his place be outside the great temple of science, not many of the rest of us will be found fit to enter."

That last sentence is a subtle allusion to the fact that even now Luther Burbank has enemies—enemies who lose no chance to belittle and sneer at him. I referred to this matter in the

chapter on the commercial value of his new creations, but I wish to add a few more words. Let me first cite a paragraph from my *Wagner and His Works*:

“Liszt’s enemies! Does it not seem astounding that one should have to write down those two words? Liszt, the most generous, big-hearted, unselfish musician that ever lived; who helped every artist in distress; who taught every student without charge; who delighted tens of thousands with such interpretations of the masters of all schools as no one had ever heard; . . . who had a kind word for everybody; who was generous even to the incompetent; who wittingly offended no one, and whose tact and amiability are evinced in all his sayings and doings—Liszt had enemies? Aye, and bitter ones; enemies who, on account of his lofty artistic ideals, finally succeeded in driving him from Weimar; enemies in the press, enemies everywhere; critical enemies, perhaps more bitter and venomous than Wagner’s.”

Darwin, the dear, kind man, who never harmed man or beast and who spent his life and wrecked his health in the pursuit of scientific truth, had as bitter and persistent enemies as Liszt and Wagner. There are professors even now who speak of him, as they do of his disciple Burbank, as being “discredited.” When my friend John Fiske came to the rescue of Darwin, in the ’seventies of the last century,

Professor Agassiz said of him, "That man Shohn Fiske is one big shackass." I myself wrote many articles in those days in defense of Darwinism, the main truths of which are now acknowledged by all scientific authorities.

In the Preface just alluded to, President Jordan cites an interesting paragraph from a speech made in San Francisco by the great Dutch botanist of the University of Amsterdam, Dr. Hugo de Vries, regarding Burbank: "A unique, great genius! To see him was the prime reason of my coming to America. He works to definite ends. He ought to be not only cherished, but helped. Unaided he cannot do his best. He should be as well known and as widely appreciated in California as among scientific men in Europe."

This was spoken in 1904. California did learn, some years later, to appreciate and honor Burbank. The Legislature of that state in 1909 made his birthday, the 7th of March, "Bird and Arbor Day." It is celebrated by the schools throughout the state by tree planting, exercises, songs, tableaux, and folk dances. It would be well if every state had a "Bird and Arbor Day" in honor of Burbank.

THE TRUTH ABOUT SPINELESS CACTUS

But some of the professors continue to sneer at him. If you ask them why, they usually answer vaguely or by saying that he "hasn't

made good with his cactus," or that "he created a spineless cactus which already existed."

Now it is true that there were in existence generations ago small species of cactus that were spineless. "One of the first pets of my childhood," Burbank himself relates, "was a thornless cactus, a beautiful little plant of the genus *Epiphyllum*. There are also members of the *Cereus* family that are thornless, showing not a trace of spine or any part of the plant or fruit.

"But the cactus plants that are thus unprovided with spines were without any exception small and inconspicuous species, and also with a bitter principle so disagreeable that cattle generally refused to eat them. So the plants offered no possibilities of direct development through selection that could promise the production of varieties that would have value as forage plants."

The problem which this dauntless plant breeder undertook to solve was to hybridize these spineless but also useless varieties of cactus with some of the large varieties, particularly the opuntias, which have peculiarly attractive qualities of size and succulence. And he succeeded in achieving this miracle. In due time such a new race was developed in his California gardens, after thousands of painstaking experiments with varieties of cactus from all parts of the world, sent to him by his friend David G.

Fairchild, the government's official plant importer, and many others.

The result of Burbank's hybridizing experiments, followed up and supplemented by the usual methods of rigid selection, was "a gigantic cactus, overtopping all its known ancestors in size, and surpassing them all in succulence of flesh, producing fruit of unpredicted excellence in almost unbelievable quantity, and having a surface as smooth as the palm of your hand."

Not a single one of the opuntias received by him from any source was altogether without spines and spicules, and "no such variety has yet been reported, although the authorities of the Agricultural Department of Washington scoured the earth to find such a variety."

In some of the South Sea Islands there are opuntias with soft, hairlike spines, but these are too tender for our climate.

"There are regions in Mexico and Hawaii," Burbank further relates, "where the cattle feed habitually on wild species of opuntias, even though this involves the habitual ingestion of millions of spines and spicules with which the slabs are protected, resulting quite often in sickness or death of the animals."

Far preferable—besides being hardy in our arid regions of the Southwest—are the Burbank hybrid opuntias. These are opuntias "fulfilling every specification of spineless forage plants of reasonable hardiness, great adaptability as to

soil and easy culture, and enormous productivity; and they are wonderful fruit producers as well. But they are the result of a most arduous series of experiments in plant development, and they constitute new races, entitled to the rank of new species if ordinary botanical standards are to be accepted, that have been developed here, and that, so far as there is any evidence, had never previously existed anywhere in the world."

Nowhere in the world is there a cactus closely resembling them in their combination of entire spinelessness and inviting forage quality.

Burbank's thornless cactus is at present used extensively on the goat farms of California as well as on the dairy farms. It supplies both meat and drink in arid regions. It is also used extensively for poultry, and many large poultry raisers consider it not only the cheapest, but the best, of all green feed for their hens. In India the Burbank cactus is being planted for the purpose of tiding people over in years of famine.

If Burbank had not succeeded in his attempt to create a giant thornless cactus he would have included these experiments in the chapter in which he frankly enumerates his failures; that's the kind of a man he is. (Remember what I wrote about his "\$10,000 bonfires.") Instead of being a failure, his cactus is the biggest and most wonderful of his successes. And it will remain a success. Until lately there was a

danger of reversion to the spiny condition when the improved opuntias were planted in stony, arid, desert soil; but the "more recently developed varieties of spineless opuntias appear to have lost altogether under all circumstances the capacity to revert to the spineless condition."

The cactus is a funny plant—unlike all others. If you put a joint or blossom, bud, or half-grown fruit, almost anywhere, including your pocket, it will sprout—but these *must be wilted* before they grow! From a single slab you may produce an entire field of spineless opuntias.

Seeds, therefore, are not needed, yet Burbank has spent years trying to raise his smooth-skinned opuntias from seeds, too. Millions were planted, and at first the seedlings did not breed at all true, but subsequent sowing resulted in an ever-increasing proportion of spineless seedlings.

At the same time, since seeds are not really necessary, Burbank has been busy trying to eliminate them from his "cactus pears," as he prefers to call them instead of "prickly pears"; and he is succeeding. "The improved varieties have seeds not larger than those of the tomato, although a little harder, and they may be swallowed with impunity." In later experiments the seeds were entirely absent.

To these cactus pears Burbank attributes—and for abundant reasons, which you should

read about in Vols. V and VI of the Collier edition—as much importance for the future nutrition of mankind as he does to the cactus slabs as fodder for cattle, horses, hogs, hens, and other animals.

As for flavor, he tells us something which will arouse the attention of epicures and fruit men: “On my grounds the choicest varieties of fruits of many kinds are grown, but the workmen usually prefer the fruit of the opuntias to any other that is in season at the same time.”

Will not some relative of Hoover come along to do a great deed? He could help the food world enormously by making the Burbank cactus pear as common everywhere as the orange and the banana. It contains some 14 per cent sugar, and is, like the orange, rich in some of those mineral salts (magnesia, soda, potash, lime, in assimilable form) which recent dietetic research has shown to be the most valuable of all food elements.

Professor Leotsakos of the Greek University of Athens, who visited Burbank some years ago, informed him that the cactus fruit is “a very important part of the dietary of millions of people around the Mediterranean for about three months of the year. He declared that he himself would prefer a half dozen good cactus fruits for breakfast to the best beefsteak.”

He was delighted with the superior quality and productivity of the Burbank improved

varieties and assured his host he would on his return to Greece make haste to communicate with the government officials, that they might at once take steps to plant these superior products of American creative genius, one of the supreme achievements of gardening with brains on record.

INDEX

A

- Annuals, 34-36, 49-54.
Apples, best, 228-231; do they keep doctor away? 232.
Artichoke, globe, 214.
Asparagus, growing, 80-89.

B

- Bailey, Professor, 207, 247.
Beans, baby, 19; Parisian, 136; stringless, 136.
Beecher, Henry Ward, 193.
Beets, sweetest, 21; sugar, 21.
Berries, best kinds to raise, 194; Burbank's new, 212-214.
Blackberries, 212.
Brains, i, 4, chap. vi, 87.
Brazilian forest roof gardens, 165.
Bulbs, 38, 43 (hints on growing).
Burbank, Luther, profitable carnations, iv; flower improvements, v; seeds, 6; peas, 20; nasturtiums, 24, 33; tulips, 40; Harwood's book on, 40; breeding for perfumes, 40; fragrant lilies, 46; gladioli, 49; rainbow corn, 53; a plunger, 67; intelligent plants, 117; attacked by preacher, 121; tomatoes, 137; potatoes, 137, 197; poppies, 142-149; Shasta daisy, 167; fragrant plants, 174; sweet peas, 175; book on, for children, 180; joys of creating, 180; strawberries, 191; new plums, 194, 196; sends no trees East, 196; chapter on commercial value of new creations, 197-218; work in 1920, 200; book on, 200; saving space, time and money, 202; bonfires and

- moral character, 204; enemies, 205, 257; plums and quinces, 209; prunes, 209; cherries, 212; cactus, 216, 260; makes fruit more digestible, 234; on papaws, 237-241; directions for improving plants, 251; bettering Nature, 256; new edition of literary works, 257.
Burpee, W. Atlee, 6, 23, 136, 142, 153, 155, 174.
Burroughs, John, 191.

C

- Cabbage, 17.
Cactus, spineless, 260; "pears," 264.
California, poppy, 143; sweet peas, 150; climate, 200; grapes, 227; honors Burbank, 260.
Calycanthus, 37.
Carrots, 16, 21.
Cats and dogs, 97.
Cherries, 194, 212.
Chickens, 100.
Corn, best in Maine, 3; how loses sweetness, 11; best way to can, 12; best fertilizer for, 24; raw and cooked, 26; saving from frost, 76; how to plant, 129; hastening growth, 138; Burbank's, 215.
Cornflowers, 52.
Country Gentleman, i, 11, 71, 91, 226.
Crows, 100.
Cucumbers, cooked, 16.
Cultivating the soil, 55-58.
Cutworms, 109.

D

- Darwin, 255, 259.
Dew, 119.

Diseases of plants, 94.
 Doctors and fruit, 232.
 Dreer, Henry A., 6, 41, 43, 142,
 145.

E

Eckford, Henry, 153.
 Elm trees, aggressive, 106.
 Eschscholtzia, 143.

F

Fertilizers, for quick start, 24;
 humus and other plant food,
 59, 67; ashes, 63; nitrates,
 64; leafmold, 67; best, for
 different plants, 68; green
 manuring, 70; for hastening
 growth, 134; for pansies, 163.
 Flavor, of Maine vegetables, 5;
 stimulates digestive glands,
 12; of fresh tomatoes, 13;
 old potatoes, 14; of steamed
 vegetables, 18; baby peas,
 20; no two ears of corn alike,
 26; melons, 27; asparagus,
 80; strawberries, 192, 193;
 plums, 194, 210; peaches,
 225; apples, 230; papaw, 238;
 enemies of, 251; grapes, 254.
 Fletcher, Horace, 185.
 Flowers (*see* names of); garden
 favorites, 30-54; annuals, 34-
 36; good book on, 35; shrubs,
 36; bulbs and perennials, 38-
 47; succession, 39; fragrant,
 50, 150, 158; unscented, 50;
 mixed beds, 51; recent im-
 provements in, 160; fragrant
 soul of, 172-181; money
 value of improved, 217.
 Fog, protecting, 76.
 Food for plants (*see* Fertilizers).
 Fragrance, should decide choice
 of flowers, 36; breeding for

perfumes, 40; grape blossoms,
 91; Riviera, 150; violets and
 pansies, 158; soul of flowers,
 172-181.

Frost, what makes it killing, 74.
 Fruits, best kinds to raise, 194;
 must we grow our own? 222;
 in New York, 227; dietetic
 value of, 232; improved trees,
 255.

G

Garden, mania, i; cities, 9;
 work made easier by deep
 breathing, 47; how to start a,
 55-62; tools, 55; sowing
 seeds, 60; thinning, 61; guide
 book, 62; using the feet, 65;
 be a gambler, 66; frost and
 fog, 74-79; diseases, 94; mira-
 cles in the, 115-123; roof of
 gardens in Brazilian forests,
 165; wild-flower, 166; as life-
 saving hobby for retired rich,
 244; creative work, 247; joys
 of and problems to solve, 251.

Garlic, 214.

Gladiolus, 48.

Gophers, 111.

Gourds, 53.

Grapes, and prohibition, 222-
 227; improvements, 254.

Grasshoppers, 94.

Greens, value of as food, 29, 72,
 183.

H

Harwood, W. S., book on Bur-
 bank, 200.

Health and gardening, ii.

Henderson, Peter, 6, 66.

Hoe, how to use, 25.

Honeysuckle, 36.

Humus, 67.

I

Insect enemies, 89-97.
 Insect friends, 98-105.
 Insurance of crops, 129.
 Intelligence of plants, 116-123,
 197.
 Intensive gardening, 129.
 Iris, 47.

J

Japan, 147, 171, 195, 219.
 Johnson grass, 78, 108.

K

Keeney, C. N., 136, 208, 247.
 Kellogg, J. H., 241.
 Kerr, G. W., 153.
 Kochia, 54.

L

Ladybird, 93.
 Lettuce, and food salts, 73;
 romaine, 152; transplanting,
 130.
 Lilacs, 31, 36.
 Lilies, 39, 45.
 Lime, 62.
 Loganberries, 213.

M

McCann, Alfred W., 72.
 Maine, climate, 3.
 Manure (*see* Fertilizers).
 Melons, luscious, 26.
 Mineral salts, 29, 72.
 Miracles in garden, 115-123.
 Mock orange, 36.
 Moon and frost, 77.
 Morning-glories, 52, 219.

N

Nasturtiums, 31-34.
 Nicotiana, fragrant, 181.

Nitrate of soda (*see* Fertilizers).
 Nosegays, 47.

O

Orchard improvement, 255.
 Oregon, 147.
 Ornamental leaved plants, 53.

P

Pansies, elm-tree roots, 107;
 chapter on, 158-164.
 Papaws, chapter on, 236-243.
 Peaches, and strong drink, 222;
 book on, 222; worst of all,
 224.
 Pears, putting color on, 252.
 Peas, baby and wrinkled, 20;
 Senator, 20; best to grow, 135.
 Peonies, 41-44, 171.
 Perennials, 38.
 Perfume making, 179.
 Phlox, 43.
 Pigs and greens, 183.
 Plums, 195, 209.
 Poppies, 140-149, 188, 206.
 Potatoes, deteriorate, 14; bee-
 tles, 90; how to get big yield,
 91; spare the roots, 119;
 good book on, 119; early, 137;
 story of Burbank's, 197; dig-
 ging, 249.
 Powell, E. P., 194, 221.
 Prohibition, 178; and the fruit
 market, 222-227.
 Prunes, Burbank, 210.

Q

Quince, Burbank, 211.

R

Radishes, 17.
 Rainbow corn, 53.
 Rapid transit to table, 9.
 Rhubarb, 214.

Romaine, 125.

Roses, 37.

S

Salads, increasing demand for, 29.

Salzer, J., 6.

Santa Rosa, 199.

Schizanthus, 52.

Scidmore, E. R., 220.

Seeds, what to buy, 6; catalogues, 6; government, 7.

Seedsmen, 6.

Shrubs, flowering, 36.

Smell, sense of, 176.

Sorrel, 115.

Sowing seeds, 60.

Spinach, problem solved, 21.

Squashes, 16, 118, 124.

Stark Brothers, 196.

Strawberries, out of season, 12; educated, 189-194; book on, 191.

Sweet peas, diseases, 94; chapter on, 150-157; fragrance, 174.

Swiss chard, 102.

T

Tacoma, Mt., *vs.* Rainier, 143.

Thinning, 61, 148.

Thomas, Mrs. Theodore, 148, 167.

Thorburn, J. M., 6.

Tomatoes, and climate, 8; red but not ripe, 13; "love apples," 30; earliest varieties, 137.

Tools, for garden, 55.

Transplanting, 125-130.

Tulips, 39.

V

Vaughan, 6, 22, 23.

Vegetables, fresh, 10-14; best, for home garden, 15-29; baby, 19; good book on raising, 23; best, to eat raw, 25; French book on, 28; French cooks, 28; ornamental kinds, 30; hastening growth, 132-139.

Vetch, 71.

Vick, James, ii, 6, 46, 69.

Violets, 158.

Vitamines, 72.

Vries, Hugo de, 199, 201, 260.

W

Walnut, 216.

Watering, 57, 65.

Weeds and weeding, 25, 26, 61, 77, 115; changed to flowers, 166.

Wheat, improved, 201.

Wistaria, 37.

Witchgrass, 77, 108.

Worms, 109.

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