







# STORIES OF LUTHER BURBANK'S PLANT SCHOOL

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"I Have Here a Plant-School."

—*Luther Burbank*

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*DEDICATED*

*To Luther Burbank, lover of plants  
and lover of children.*



## INTRODUCTION.

Luther Burbank is a new manner of man, doing a new work. This book tells the story of how the man became what he is, and how he learned to do the wonderful things so many have heard of, but about which so few really know. It is written for the children, yet many an older person can glean with interest from its pages, and no doubt it will be the cherished volume of many a nature lover,—a thoughtful gift to many a lover of flowers, serving to open wide the hidden laws of plant and tree life.

The thought of these stories is in line with the spirit of the age. To unfold the use of natural law and to use natural force as a leverage to make mankind more comfortable and happy, giving the soul a chance to expand—that is the problem of the ages. We have harnessed water power, steam, electricity. We have vaguely known that species of plants were susceptible of improvement. Even the Indian by a sort of unconscious selection improved his corn. Now suddenly it has burst on the world that plants by cross-pollination and selection, by care, study of habits and fertilizers, may have their power as food producers and for beauty multiplied by the score or even by the hundreds. How is it done? How can it be done? This little book is an attempt to open this door to knowledge.

Among certain classes of American people the drift is clearly to the farm. In fact farm life has a charm for most people that cannot be conquered. The effect of rapid transportation, quick and easy communication, is to put the farm a dozen miles from the city's center closer than the villa which, a score of years ago, was a mile's walk away. Once educate the public into the riches of scientific growth of plants and animals and the farmer will no longer be falsely looked upon by the city-bred as plebeian or peasant. New methods of farm life are to make human life, as far as it can be on this globe, the Eden where "every day turns a fresh inspiring page, each season is a stronger chapter, and life is a continual joyous revelation."

The aim in writing this book has been to build an interesting and practical science reader for children. In further spirit of the times it has been couched in story form. Selections from the stories, with comments by the teacher, may be read aloud to the fourth, fifth or sixth grade, and this with great advantage.

Its most effective work is to be done in the seventh and eighth grades where it will go very far to make a success of nature study, agriculture and school gardening. Being the work of successful and experienced teachers, all of whom have lived within the shadow of the Santa Rosa experimental gardens, who have known the famous plant creator personally, and who have had his sympathy, suggestion, and criticism, the schools of California are to be congratulated upon the opportunity to get, first hand, Burbank's spirit and method. Much or all of these pages have been tried out in the class-work of these story writers. The work has, therefore, been planned to please the pupils, but as well, to instruct. Mrs. Beeson, Mr. Burbank's sister, has put into her share of the work many things never before in print and these will help the public to understand the life and instincts of her brother.

The plant-master himself, has a great love for children and has taken from his own busy life, over-crowded with duties bearing upon his great study, to pass upon, and criticise chapter after chapter of the following pages. It was like the intense, inspired worker he is, to do this, for he always sees the thing necessary to be done, and even in the touches of attention given to these stories, there is evidence of the same lesson of toil and application, the intention to carry to a successful issue any problem he undertakes to solve. In its ultimate analysis, his work always proves a work of the spirit.

He writes his name upon the garden leaves,  
And conjures with the blossom hour by hour;  
And like the mystic basket-maker, weaves  
His soul into the beauty of the flower.

This book, it is hoped, will blaze a clear trail to new and better work in making plants what they should be—better producers of sustenance for man, and better bearers of that beauty which is food for his soul.

HENRY MEADE BLAND,

*Department of English, State Normal School, San Jose, Cal.*

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STORIES OF  
LUTHER BURBANK'S  
PLANT SCHOOL





## CHAPTER I.

### THE PLANT SCHOOL.

MANY, many thousands of plant pupils are each year enrolled in the Burbank plant school at Santa Rosa, California. They are not there to produce fruit, nuts and vegetables for food, or flowers for beauty alone; but to be developed, educated, trained; and thus to acquire new habits and characters, that they may be of greater worth to the world.

Pupils come from every land seeking admission, many of them having very interesting histories. Some are from the gardens of the King of Italy, others from the royal gardens of Japan and some have been sent by missionaries from far away Siberia and India and from many out-of-the-way places of the earth. There are pupils from Australia and New Zealand, from Alaska and Patagonia, from Europe and South America.

To secure strange and rare plants, capable of improvement, men have searched the most remote places. They have climbed mountain precipices, forded overflowing streams and crossed barren plains, many times meeting discomfort and danger in the work. Always, however, the trees and plants of our own land form the largest groups. Not alone are those which are commonly cultivated and of recognized **value given a place; but often a despised or neglected weed**, at first appearance quite unattractive, has become a prize pupil in the school.

Not always because of apparent good qualities do plants obtain a place. Some possess latent, or undeveloped tendencies, of great value; others are plastic, responding to environment, and, under the direction of the master, readily form new habits and characters. Still others are simply lazy, degenerate members of a good family, and, by patient care, may be corrected and reformed, so as to become useful citizens of the plant kingdom.

Luther Burbank, the teacher, sees wonderful possibilities in plant life; but he knows that each desired shade and tint, form and grace, perfume and flavor, must be developed in the character of a plant by slow and repeated effort just as a child is trained and directed year after year by loving parents and teachers. He works patiently; and, when the least indication of improvement is seen, continues his efforts with the plant; otherwise, it must be rejected and the place given

to another. As plants are less responsive in their nature than children, in this school ten thousand in one class may fail and only one meet the requirements and yet the work go on; for, like the master, plants seem never to become disheartened. Usually from six to eight years are required to complete the education of a pupil, but some have remained under his tuition for thirty or more years.

Beautiful vines climb over the Burbank home in the "City of Roses." It is a large square house, somewhat resembling his childhood home. Around it the flowers bloom and trees and shrubs grow with so much of their native air and grace that it has become a favorite haunt of the birds. Even the shy quail run across the lawn, and, unmolested, rear their little ones in the quiet shade. A narrow, winding foot path under the trees leads to the Santa Rosa creek, whose banks are lined with trees and vines. Among these every morning the woodthrush sings with the same sweet, clear bell-like tones that charmed Burbank, when a boy in his New England home.

No less lovely than the plants surrounding the home are the eager, happy faces of the school children, as they peep through the fence at the master and his flowers. That the boys and girls know and appreciate his love for trees and birds is shown by the following pledge voluntarily signed by the four hundred children of one of the Santa Rosa schools and presented to him on his 62nd birthday:

"Today, as a part of our Arbor Day exercises and in honor of one, who is, we know, a sincere friend of birds and trees, we pledge ourselves to befriend all of God's creatures, to protect the birds, and not to maliciously destroy trees or any of the other beauties of nature."

Just across the street are the experiment grounds. The enclosing fence is so low that passers-by may see and enjoy the beauty of the flowers without entering and thus interrupting the work. Entering at the gate one meets bright, happy flowers on every side.

Here is the vine-covered cottage in which for many years the mother, who gave the master his first lessons in plant culture, lived with him, while her hair became white and her steps slower as she neared the land where the flowers never fade. Over the cottage gently sway the graceful boughs of an elm tree brought by Burbank years ago from the Massachusetts home; and near it among rare trees and shrubs from foreign lands grows a beautiful white birch, also from the childhood home.

Near the conservatory are the packing sheds, where trees, plants and bulbs

are made ready for shipment, and are started, often on very long journeys, in exchange for other seeds and plants.

In the conservatory the seeds are sown in boxes, and the baby plants break through the carefully prepared soil to meet the light of day, sometimes many thousands in one box. Often, as one enters, a little brown tree toad jumps upon the door-knob and awaits recognition. The very valuable work of toads in destroying insects is understood, and this is an especial pet. Its tiny bead-like eyes note every movement, and the little fellow jumps upon Burbank's extended hand and curls down to be softly stroked by him.

When a few weeks old the little plants are given more room by transplanting into other boxes; later these boxes are placed outside and protected by large wooden frames, until the plants become hardened so that they are able to withstand sun and wind, then they are set in beds, where the soil has been made ready for them.

The grounds consist of eight acres, under the most intense cultivation, on which, no doubt, are growing more new, rare and curious plants than elsewhere, in the same space, on the globe. Narrow paths separate the beds of growing plants, which are arranged, not like a park for the enjoyment of visitors, but like a work shop; for here, to those who understand, the real skill of a master hand is most in evidence.

The little pollen carriers, the humming birds, the bees and butterflies, revel in this wonderful garden; and sometimes become bewildered, when some strange flower from a distant land first opens. Its form and color being unfamiliar, they do not know just how to approach and extract its sweetness.

Eminent scientists and nature lovers from all lands have come to these grounds to study plant life. Public speakers and writers have here found their themes. Poets and musicians as well as artists have gathered inspiration from this beautiful laboratory of nature.

“Who kneels to learn the lily's shining creed  
Grows like the lilies, liker Christ indeed,  
Thou, of all these, whom God has set apart,  
High priests of nature in the shrine of art,  
Thine are the secrets of the inner shrine:  
To lift the veil from Nature's face to thine;  
To speak with reverent awe the magic spell  
That bids the wonder be a miracle;

*Stories of Luther Burbank's Plant School*

To break the tyrant chains of red or blue  
That binds the flower to its ancestral hue;  
To bid the royal purple to unfold;  
Upon the native pansy's gown of gold,  
To touch her velvet robes and bid them be  
All colors that the rainbow held in fee.  
These are the highest, holiest deeds of man,  
Completing what the soul of God began.  
A gracious gift that from a golden store  
Enriches beauty grown from more to more.”  
—*Samuel J. Alexander.*

## CHAPTER II.

### THE PLANT SCHOOL—CONTINUED.

THE GOLD RIDGE proving grounds, where the more extensive work is done, are eight miles west of Santa Rosa, near Sebastopol. On an eastern sloping hillside sixteen acres are devoted to the growing trees and plants, all in working attire, seeking perfection. Just inside the enclosure is the pretty cottage occupied by the **superintendent of the grounds**, and in which has been furnished an office and rest room.

The view from the place is very picturesque, overlooking the beautiful Santa Rosa valley, with its wooded hills and low mountains as a background and Mt. St. Helena purpling in the far distance.

Narrowing bands of deepest crimson, delicate pink and many other shades and tints, extend from the entrance up and over the hillside. These magnificent flowers are the new gladioli. Wonderful new Shasta daisies glisten in the sunlight like banks of snow. Great flaming amaryllis, golden lilies, watsonias, crinums and scores of other flowering plants form lines of exquisite beauty.

The location of each variety is designated by a small neatly painted stake; and all are arranged with reference to their needs in regard to soil, moisture, cultivation and test, rather than for artistic effect.

Blackberry, raspberry, Phenomenal, Primus berry and other vines, and many kinds of native and foreign shrubs, are also growing in long rows, marked by similar wooden stakes. So familiar is the master with his pupils, that were all these stakes removed he would at once recognize each. But that all the work be scientifically accurate, plan books are also kept, having plots and maps showing the exact location of each class and giving its record.

Further back are apple, pear, cherry, peach, plum and other fruit trees, together with nut, timber and ornamental trees. Whether robed in simple green, bright with pink and white blossoms, rich with the many colored fruits, somber with the russet of autumn or with their long bare branches reaching upward, the trees are always beautiful. Native and foreign trees, with intermingling boughs, seem to form close friendships; loquats from Japan with figs from Italy, the ever-green olive and orange with those trees which clothe themselves anew each spring-

time. The trees from the southern hemisphere often experience considerable difficulty in adjusting themselves to the new conditions. It was very amusing to watch some apple trees, sent from South America. The first fall they were in California, they put out tender green leaves and opened pink and white blossoms just as the other trees were preparing for the winter's rest. They seemed conscious of having made a blunder and soon dropped these signs of springtime, yet were confused; and it was two or three years before they learned the proper time to array themselves in the beautiful garment of spring.

Many of the trees have small wooden labels wired to the different limbs, giving the name of the variety which has been grafted in, sometimes several hundred upon one tree, as thousands of new varieties are constantly being tested in this way.

Birds build nests, chatter and sing in the trees, feasting upon fruit, nuts, berries and seeds so abundant here; no doubt earning an honest living, as they destroy many injurious insects. Yes, little birdies, you know the earliest and sweetest cherries, and are quite welcome to your share. But why persist in the wasteful habit of taking only a bite from each one and spoiling so many that the master is compelled to protect any especially choice fruit by covering the tree with netting?

Here is a ripening seed pod, very precious, for it the master has waited years; along comes an inquisitive little bird, who wishes to try the flavor of those very seeds. Ah, ha, little bird, your habits are known, and a paper bag has been snugly tied over the seed pod. Sometimes an enterprising squirrel or rabbit comes in from a neighboring field for a meal of nuts or vegetables. The most unwelcome guests, however, are the little brown gophers. More than once have they destroyed priceless bulbs, which could not be replaced. Yet no enmity is felt by the master toward them; for upon roots and bulbs must they depend for their food.

The young trees, and those plants, which require a long time for testing, are brought from the Santa Rosa experiment grounds, as much of the work begun there is completed here. Many workmen are constantly busy preparing and cultivating the soil, planting, trimming and training plants, seeing that sufficient food and water are provided, and that the health of each plant is maintained.

Although only competent, reliable men are employed, yet each plant has also Burbank's personal attention; as he alone is able to discern the slight variations in growth or habit. Passing by a class, he often stops to tie a little white string around the stem of a plant in which a certain trait or quality has attracted

his notice and with which he wishes to become better acquainted. Or, perhaps, he places on a stake or a label a double cross (#). This is his "O. K." mark; and, whether upon a new fruit, an important manuscript or a piece of pie, which pleases his taste, it signifies work well done. In his use it is very comprehensive, expressing a great deal; as not only are fractions expressed by using only one, two or three lines instead of four in the cross, but two or more crosses are often used.

At the testing season, during the long summer days, Burbank spends much time at Gold Ridge. As each fruit under test ripens, photographs are taken and a complete record is made and compared with that of previous years. The size, shape, quality, flavor, color, general appearance, keeping quality, hardness, amount of fruit to the tree and many other points are noted. Each year many badges of honor are bestowed; and each year some new fruits and flowers are graduated. Many more are continued for further development and training, while some must be rejected.

Some of the pupils when they enter the school have only family names; but in their re-creation, as they assume new forms of beauty, or of utility, they become individualized and receive an added name—a baptismal name—retaining, of course, their original family name. And just as they have come from all parts of the world, so in their new and improved forms they go back to distant lands. So widely have these fruits and flowers been distributed, that it is true that, "The sun never sets on the Burbank productions."

"In all places, then, and in all seasons,  
Flowers expand their light and soul-like wings,  
Teaching us, by most persuasive reason,  
How akin they are to human things."

—*Longfellow.*

LUTHER BURBANK.

He took a little jostled wayside weed—  
His intuition keen without a peer—  
And read each wound and every weakness clear;  
Then struck his finger gently on the seed,  
And touched the slender starving wind-blown reed,  
And to it said, "Thou ailest here and here,  
Thou needest only food and loving cheer  
To gladden any garden, glen or mead."  
He walked with Patience many a tedious hour,  
With Genius' glowing lamp aflame in hand;  
Or sat with her in Wisdom's citadel,  
And heard the watchman calling, "All is well;"  
Then saw the shrunken, blighted bloom expand  
Into a graceful, snowy, starry flower.

—*M. B. W.*



## CHAPTER III.

### THE STORY OF THE SHASTA DAISY.

THE little wild field daisy, that grew on the flower-decked green slopes around Luther Burbank's childhood home, was considered by the farmers an evil thing, a persistent and vicious weed. Burbank's great loving heart seemed to go out to this little forsaken thing, which, to most persons, was an intruder, not deserving even a place in which to live. He singled it out from the attractive flowers, that appealed to everyone—the violet, the aster, the delicate anemone, the golden rod, the trailing arbutus, the lily, the rose—not for lack of love for these; but they had friends a-plenty, the daisy scarcely one. He would show it friendship, and give it a chance in the world to be something.

It was like taking a little neglected orphan child, who had never been rocked in a fond mother's arms, or kissed to make it well. He would teach it new ways of which it had never known. He would love it into a royal life, make it a queen among its kind—this little waif.

So Luther Burbank took his little childhood friend, the moon-penny daisy, from its home within sound of the Atlantic's roar, and placed it in his plant school on the Pacific coast among his rare and most choice flowers. Though his every hour was crowded with work, he made time to plan a glorious future for it; and his interest in it held throughout the years of patient attention he gave to its development.

In England there grew a daisy similar, but somewhat larger in size, whose coarseness excluded it from the royal flowers. And over in Japan still another, quite small, but dazzling in pure whiteness. Neither of these, however, was as hardy as its American cousin, so tenacious of life, nor as productive of bloom. But in the three—this trinity—Burbank saw an outcome most wonderful.

The three little daisy cousins were brought together in the school of the great scientist; and the process of culture and development of character began. The American daisy furnished a strong constitution, the first essential; the English daisy gave size for its endowment; while the Japanese daisy contributed purity, which is important in the highest degree. These, when united, would give strength, beauty and importance.

Soon they blossomed, nodding and beckoning to each other, and growing to know each other as neighbor children do. Then Burbank visited them, and called upon them for some of their golden pollen. First, he took this life element from the English daisy, and, carrying it upon his watch crystal, bestowed it upon the American daisy. He then waited until the seeds from the two united flowers ripened, which were only a few in number. These he treasured carefully until the time to plant them. Their great benefactor then bade farewell to these two little pupils, the English and the moon-penny daisy, for their life-work was done.

He came again when the little plant children from these few seeds were dressed in their white gowns. This time the Japanese daisy gave him of her golden horde. He carried it in like manner to the new seedling pupils. Then the Japanese daisy passed, for her work was done, also. Again he must wait for the new pupils to ripen their seeds, and still longer, until they were planted, grew up, and were white with bloom; for then selection, or choosing, which should live for usefulness, would begin.

Then with loving eyes he viewed the company, and with vision keen he singled out those which gave promise of the qualities, strength, size and whiteness, combined with grace of form and profusion of flowers. The others must all give way for their growth. The seeds from the best of these were gathered; and the next season the finest plant pupils were selected from the number.

This process went on for several years, until a hundred thousand seeds were saved, and planted in a space about ten feet square. When large enough, they were transported to the Gold Ridge grounds, where they were given about an acre to insure plenty of room for their further development.

All these years Luther Burbank protected his little pupils from worms, gophers, and plant lice, giving them the tender care of his own hands—not trusting it to others, whose sympathy might be less than his—for it is a known fact that love calls out response in the growth of plant life, as it does the best there is in human life. So love rules in the plant world as it does in our own world.

When the one hundred thousand plant pupils were well started, another important stage in the upward life of the daisy was reached. For six months they blossomed. Twice a week the teacher scanned, with unequalled perceptiveness, bloom, stem and leaf of each individual, noting every variation from their parents. One would have a wonderful blossom on a scrubby stem, one a graceful long stem, but its flower would not be perfect in whiteness; another would have

strength and grace, but lack beauty. Out of this large number only those that came nearest Burbank's ideal were allowed to live and bear seeds.

For eight years, with patience and perseverance, he worked with his daisy. Sometimes a blossom would measure nearly two feet in circumference, seven inches from tip to tip of petal. But this was not selected. It would not stand in every clime, and thrive under every condition. It lacked sturdiness or substance of petal, and would not be able to withstand the bright sun and the storms. It was much like a precocious child in school. He wanted a daisy that would gladden the heart of a flower-lover in Alaska, the same as it could be hailed in Florida, Norway, or Italy—one that would flourish in all soils and all climates with average treatment; for a master could not always care for it.

So from the medium-sized daisies, pupils were grown and regrown, the flowers being from three to six inches in diameter; for sturdy plants only would be hardy, and give good keeping qualities to cut flowers.

We have from these years of patient toil and constant care, a daisy that will thrive north of the arctic circle, or under the equator; and will give, on long graceful stems, in abundance, flowers of snowy whiteness, from three to six inches in diameter, with a large golden center; and, when cut, will remain fresh from ten days to two weeks.

This regal flower Burbank named the Shasta daisy, from the snow-capped peak of northern California, Shasta, meaning white, or whiteness.

One of the peculiar habits of this wonderful new daisy is, that, unlike its ancestors, it never volunteers, or seeds itself, producing only a few large seeds; therefore it never has and never will become the pest that it was in the wild. A self-sown daisy has never been found in the plant school. The teacher's work there is not only to breed in good qualities, but to eliminate bad ones. The daisy was induced to drop her one bad habit of spreading in the course of her education.

To the achievement of this stately daisy Burbank has added a double daisy, by selection alone; choosing each year those that showed a tendency to become double. The petals crowded closer and closer together as the selections were made each year, until a pure white, perfectly double blossom was obtained; a more than rival of the chrysanthemum, as the daisy blooms from five to seven months in the year.

Three strains of this daisy were perfected—the Alaska, the California, and the Westralia. Another, newer still, is a beautiful fringed daisy far finer even than any of the others.

## CHAPTER IV.

### THE CLIMAX PLUM.

A GOOD many years ago there came to the plant school two queer pupils. One, little Simoni, was a plum pupil from China; and the other, little Triflora, was a prune pupil from Japan. They were quite lonely at first, and felt strange, for everything was so different to anything they had ever been near before.

Simoni was a very funny little fellow, and produced fruit that, though spoken of as a plum, was shaped more like a flat tomato, and was so bitter that it puckered one's mouth all up, as an unripe persimmon would.

But the oddest thing about it was that it had almost no pollen at all on its anthers. It was hard to find even a few grains. Burbank had once found some; for you must know that he could find it if anyone could. These few grains he used in creating the Delaware plum, one of the parents of the Bartlett plum.

Now the Bartlett plum is a very distinguished pupil, for it has the exact flavor of a delicious Bartlett pear. Indeed, to prove this, one of the foremost fruit men of the world was blindfolded and given some of the fruit to taste; and, not knowing what kind of fruit he was eating, said, "It is the finest Bartlett pear I have ever tasted." It is also very attractive otherwise, having an upright, erect form, and beautiful, glossy, green leaves. The fruit is yellow, turning to deep crimson when fully ripe. It is firm and juicy, with salmon-colored flesh.

So the scientist saw the good in little Simoni, and knew that it would be of still further use in the world, if properly trained.

Triflora was a more lovable child, with a much sweeter disposition; and felt better acquainted, for other pupils from Japan had been trained in the plant school. You know that children tell each other about their school days, and anything new that they have seen and enjoyed, so perhaps Triflora had heard more about it than Simoni had.

The other Japanese pupils had been very helpful in making many kinds of new plums of different sizes, colors, flavors and qualities, that had gone out from the school to make the world richer and happier. There was quite a corner given to their improvement, for there were so many of them. Five hundred kinds had grown together on one big plum tree, at one time, and three

hundred thousand are now growing in the Gold Ridge training school, at Sebastopol.

When March came all the plum trees were white with bloom, shedding their petals like snowflakes, and filling the air with sweet odors. Simoni and Triflora flaunted their white blossoms, too, and gave out a delightful fragrance, doing all they could to show their gladness that spring was coming.

The wise one then came to give them personal aid and instructions. First, he took out his microscope and examined Simoni's flowers. Yes, there were a few grains of pollen—a very few. He carefully gathered the anthers on a watch crystal, and put them in a safe place to dry until the morrow.

He was out early in the morning, when the bees began to hum, preparing the blossoms of Triflora to receive the precious grains of golden dust. When he had finished, and placed tags upon the fertilized blooms he left them in the care of Mother Nature until the fruit should ripen. Their pits would then be labeled, and saved for the next year's work in training.

When tiny plant pupils from these pits were growing happily the master came again, this time to examine them for the selection of the best. His keen eye ran rapidly along the rows. Only about a score of leaves were on the slender stems; but if he found one whose leaves were larger, smoother, or that had a more even margin, or a stronger petiole on one than on others, it would, he knew, be almost sure to bear either a larger, a sweeter, or a firmer sort of plum. It received his badge of honor. There were only a few of the elect, the others—all the others—were sent out of the proving grounds.

The selected ones need not wait six or seven years to bear fruit to prove themselves worthy; for Burbank does not do things that way. Oh, no. The skilled workmen took them from their little beds, and tenderly placed them on the sturdy arms of a full-grown plum tree, so that they would only have to wait one or two years to bloom and bear fruit, saving much valuable time in their school life.

Among these little plant children of Simoni and Triflora, that grew so beautifully, rocking and swinging in the gentle breezes, admiring each other all the while, basking in the sunshine and drinking in the showers, were several that bore fruit of rare flavor. But there was one especially that would even fill a room with its delightful fragrance, like that of a pineapple. And when it was eaten, one could think of nothing but bananas, it was so delicious. Burbank was so elated with the qualities of this little child that he enthusiastic-

ally exclaimed, "This is the Climax!" And now it is known as the Climax plum everywhere, for it has proven to be one of the finest shipping plums in the whole world. It is sometimes spoken of as the "king of plums," owing to its extreme earliness, and its immense sized fruit, which is heart-shaped, deep, dark red in color, with rich yellow flesh.

## CHAPTER V.

### MISS ESCHSCHOLTZIA HAS A NEW DRESS.

LUTHER BURBANK stood in the open near his home one bright spring morning admiring the beauties of nature around him. There were wild flowers everywhere, and such gorgeous groupings,—delicate nestling baby-blue-eyes, fragrant white forget-me-nots, purple larkspurs, snowy meadow foam, all woven and interwoven into one great rug. The upland ran one sea of gold,—California poppies, lifting their molten chalices to the sun, smiled upon him. His eye, lit with tender enthusiasm, feasted long upon them. He stooped to caress some of the yellow petals near his feet saying:

“This beautiful dress of bright golden hue which you have worn so long is very becoming to you and exceedingly appropriate to this land of perpetual sunshine. But Miss Golden Cup if you would sometimes adorn yourself in a dress of white, pale cream, pink or crimson, we would love you still better than we do.”

Suddenly his practiced eye caught a crimson hair-like ray on one golden petal as if Mother Nature had made a mistake in using her carmine dye. The scientist immediately resolved to form a poppy class in the plant school. He protected this plant from intruders and shielded it until the seeds ripened. He knew that he must be alert if he would get the seeds so he placed a paper bag over the ripening pod.

All the Eschscholtzia family have taught their pods to pop suddenly open when thoroughly ripe, thus scattering the seeds so that the young plants may have more room and fertile soil for homes. When the seed pod bursts it makes a loud noise and the California children say, “Miss Poppy is firing her pistol.”

The Eschscholtzia is intensely bitter, therefore has few foes to war upon it. It is said to be more avoided by slugs than any other plant.

The seeds, from the poppy with crimson ray, were sown in the plant school. Soon young Eschscholtzia pupils peeped through the soil. Leaves and buds appeared, which were soon followed by golden flower cups.

Little Miss Eschscholtzia is a quaint maiden who wears a peculiar green pointed cap like a Brownie's toboggan. This is adorned with a delicate frill

which has a rose-hued edge. She doffs this cap before making her bow to the world, then spreads out her yellow satin gown and dances in the sunshine. She is not only quaint but wise as well, for when the fog blows in, or the rain approaches, she folds her garment tightly about her, lest her beautiful sheen be spoiled or her golden dust injured.

These little *Eschscholtzia maidens* were being taught to change the color of their gowns, so when examination day came the master put white ties around the stem, close up to the blossom of those who seemed to be trying to obey his instructions.

The workmen knew, when they saw these ties, that plants wearing them, must be carefully watched and their seeds saved, while their sisters with the accustomed golden dresses must be rejected.

How proud these plant pupils surely felt as they stood erect with snowy ties around their little necks,—a reward of merit never before given to one of their kind.

The second year, thousands of *Eschscholtzia* pupils were in the school. Soon they spread their bright petals to the breeze, and to most people were not unlike their brothers and sisters in the field. The master came again with the badge of honor, white neckties. Many of the pupils were like their ancestors and waved their saucy yellow heads as if to say: "The Spanish fathers called me *Copa de oro*. I represent the great gold fields of California. I am the State's adopted flower. I have stood for centuries weaving the golden sunshine into the meshes of my gown. I'm not going to change my beautiful dress of gold." Burbank, however, passed these saucy ones by and found some more obedient, they had crimson in their petals. These were chosen and promoted.

For eight years this selection went on, and a beautiful crimson poppy is the result. Since this time, through selection, other varieties have evolved, until now we find little *Eschscholtzia maidens* in all kinds of beautiful dresses. Some are snow white, others range from light cream to straw color. Many are a deep purplish crimson, while others have decided to wear pure crimson with golden yellow for trimmings.

*Eschscholtzias* of these colors and shades are now being graduated from the plant school and enjoyed by people throughout the world, while the golden blossoms continue, as before, to burnish the hills and valleys of California.



## CHAPTER VI.

### THE TRAINING OF THORNLESS.

"LET us out! please let us out!" pleaded a chorus of wee, wee voices from the envelope. "We are so dry that we feel as if the life within us were perishing."

The seal was broken and the tiny berry seeds were poured into the palm of the scientist's hand. Just a few seeds, from a peculiar blackberry, sent by an unknown friend in the East! The letter was short, only a few words, but the master knew that the seeds might contain a prize, so he folded the letter carefully and placed it among his choice messages. The berry seeds were taken to the kindergarten department of the plant school.

Here they were given a warm bed of earth in which to lie. The master knew they would be happy in the lap of Mother Nature for she gives light, moisture, air, and plant food needed to strengthen her children.

Summer with her glow of warmth and mellow sunshine was fast approaching, when the teacher decided to give his new pupils their first test. To his surprise and delight he found that some had small slender arms that were almost smooth. These were allowed to remain in the school. The next year when they were clad in white they looked very beautiful. Soon small, green, gnarly berries took the place of the snowy blooms, and later, when the fruit was ripe, it was nearly as hard, knotty and tasteless as when it was green. The master, now, understood well that the task of making his pupils of the envelope perfect would be a difficult one, still he persevered.

Seeds were saved and the following spring the kindergarten was crowded with more young berry pupils. There was one advantage in this particular class over the classes of *Rubus* that had been graduated. These could be selected in the kindergarten. Their promotions were made on their willingness to leave off their weapons of defense, so the little fellows had to undergo the test. When one was found that appeared to be making a desperate struggle to free himself from thorns, he was given a place in the Gold Ridge school.

Now, in the education of the Phenomenal, which is a luscious berry somewhat the shape and color of the Logan berry, but larger, firmer and much sweeter, the master had to train many thousands of plants and wait until they

ripened fruit before making selections, but year after year for several years thornless vines were promoted from the kindergarten, finally twenty thousand or more berry scouts had lain down their arms and stood in great ranks in the Gold Ridge school, an honor to their teacher and a blessing to all boys and girls, who have received the stab of the sharp thorns on the blackberry vines.

Thornless surely feels proud when the world's great scientists, who visit the school, take his long, slender, smooth arms in their hands, place these green arms against their cheeks, stroke his glossy coat, and praise him for his beauty and for the delight he is to bring to the world. To these words of encouragement the master replies: "He is not perfect yet, more time is needed."

Thornless has been in the school for twelve years; he has had the constant care of the master. He could, no doubt, have been trained to produce good fruit by constantly selecting the best, but where there is a shorter road to the goal Burbank always chooses that road.

The choicest black berries have been chosen, pollen has been taken from these and with it the blossoms of the best thornless have been crossed. Selections of the best are again made and so the process continues until now, 1913, the berries of thornless vines have attained a superior flavor, and in size equal the other cultivated varieties.

How soon this pupil will be graduated is not at present made known, but when commencement day has passed and he bids good-bye to his Alma Mater all children will hail with delight the advent of Thornless.

How much of the future profit and pleasure would have been lost to mankind had Burbank destroyed the few seeds of the envelope cannot be estimated at the present time. The work of changing all our berries to thornlessness is progressing, it is yet in its infancy.

## CHAPTER VII.

### FRAGRANCE.

THERE was in the plant school a society of flower pupils who were united by a mutual bond of sympathy. Some had entered for training along one special line, and others along another; but they were alike in one respect. They lacked the sweet odor, which appeals to everyone, and which many of the more favored flowers possessed.

Now, the fragrance is the spirit of the flower; and without spirit, you must know, one can accomplish but little.

One of these, the dahlia, seemed to shrink from contact with the others, and did not care to be touched; for it had long since learned that it lacked the one crowning quality, fragrance.

In fact, it had often heard remarks like this: "What a pity the dahlia has no fragrance!" "What a delightful perfume the violet has!" "How refreshing these sweet peas are!"

Naturally it was a little jealous and envious; but it was seemingly so helpless that it must be pardoned this weakness.

Year by year Burbank had noted its development in becoming more beautiful and more hardy; and from time to time dahlias from other lands had been introduced to assist in improving the style of her dress, and its rich colorings.

One day she heard the teacher say, "The dahlia is such a fascinating child to teach. I wish I could persuade her to become fragrant. She is very responsive, so I am still hoping that she will obey me in this."

Then this little dejected pupil took courage, and began to send up silent appeals to the wise one for help, promising to do all she could to help herself. And when she put this promise into effect, she felt something awakening within her, for new vibrations were thrilling her through and through. Her longings were, perhaps, the most intense of any flower-child in the school—her pleas the strongest.

The dahlia was surely a delight to look upon. Her dress was neatly made, its texture was fine and rich, while its colors were always pleasing. Single dahlias were too charming in appearance to be compared to anything. So she was known

as a coarse flower only for lack of fragrance. She would be so happy and useful if this fault could be corrected. You know the bee is the happy guest of most flowers, but she was less attractive to them, though she waved her bright banners as they hummed by.

There was a touch of pride in the single dahlia, for it had heard Burbank say to a visitor one day, "I like single dahlias better," and touching the long graceful stem, he added, "See this stem; it is three feet long. I have worked a long time to give it this long and strong, but slender stem."

Sometime after this, as he was passing the dahlia proving plot, there came to him a faint, elusive fragrance, which was very sweet. He felt quite sure his hopes were coming true—that the dahlia would attain the perfume she so much desired, and be promoted to the class of fragrant flowers.

He sought out the one flower that gave forth the fragrance, and guarded it until the seeds should ripen, which in due time were carefully planted.

Some of the little seedling pupils gave a hint of perfume like the rich magnolia blossom from their first flowers. These were jealously protected and cared for by the master-prover, while he kindly dismissed those that gave no sign of improvement in fragrance.

For several years he gave them special attention, selecting and planting only the seeds from the fragrant flowers. Finally the full reward came—the prayer of the dahlia was answered, for one had the full, sweet fragrance of the magnolia.

The dahlia was thus given a rare and lasting perfume by intelligent selection alone, under the direction of a great creative mind.

The verbena, which was scentless most often, but sometimes having an unpleasant odor, pleaded for fragrance, also. It was a lovable child otherwise, always clothed in dainty, delicate colors.

At the close of a summer day, as Burbank was walking among his plant pupils, he paused by the verbena plot; for there was wafted to him from their midst, on the soft evening air, a faint perfume. A thrill of delight ran through his very being. He eagerly examined every bloom, hoping to find the dear little one that had greeted him with a response to his oft made request. But no—the shy maiden had hidden herself, and with a feeling of great disappointment he moved slowly on.

A whole year passed, and, on just such a balmy evening, in the dusk, the fragrance came to him again, as he neared the plot.

This time the search should be more thorough. He would see to it that she

did not elude him. Stooping closely, he plucked bloom after bloom; for you must know that they are lowly in their ways.

At last he came upon the one that had swung her censer so lightly, sending out a faint, sweet fragrance—a suggestion of the arbutus when it first opens its spicy blooms. You may be sure that he marked well his treasure, and encouraged it to put forth stronger efforts; and, when its seeds were ripe, they were labeled and placed in security until the season for planting came.

From that time, for several years, a selection of the most fragrant flowers, from the offspring of this verbena pupil, was made, closely watched, and tenderly cared for. The fragrance became more and more intensified with each year's selection; and finally one was found to have the full sweet fragrance of the trailing arbutus firmly fixed; and was given the baptismal name, "Mayflower," which is the common name of the trailing arbutus. This little maiden wore the same dainty pink dress that has always adorned the arbutus, and was well named for both fragrance and color.

The next one in this society to have its prayers for fragrance answered was a calla, or richardia. It had no odor, but was otherwise a universal favorite. The scientist had already given many years to its training. He had changed its size, and the color of its dress had assumed many tints and shades. She patiently awaited the time when the spirit should be the crowning of her school work. Then she would be able to go forth into the world fully equipped. The reward came, as it does to all who earnestly seek it. This calla now lifts her urn with stately pride to those who love her, and gladdens them with a refreshing perfume.

This docile child Burbank appropriately calls "Fragrance," and delights in the great profusion of her blooms.

This society is now a happy company, shedding refining and elevating influence everywhere. And oh, how gently the work of training was done! No harsh treatment, but kindly care and earnest sympathetic insight, guiding Nature into right paths, as a tender parent guides the footsteps of a little child.

## CHAPTER VIII.

### THE LITTLE IMMIGRANTS.

Six little immigrants from across the wide ocean coming to

“The land of the free

And the home of the brave.”

They came on the long journey, half around the globe, to be educated and developed in the plant school.

Oh, how tired, thirsty and cramped they were, after such a long journey closely packed in a tightly sealed tin box. It was hoped that they would sleep all the way, just as many plants lie dormant during cold winter months; so probably they knew little of the experiences of the journey.

They were brave little fellows to come at the master's request; for once before some members of their family made the attempt and perished on the way. Although the climate of Australia is not greatly different from that of Santa Rosa, yet the travelers had to pass through the tropical regions and to remain more than a month in close confinement.

The master, who was awaiting the coming of the new people, eagerly broke the seal and opened their prison house, tenderly examining each, placed it in damp mellow earth.

Soon these six little rhubarb plants began to expand, becoming very wide awake, sending up green leaves on beautiful crimson stalks. Once established in the plant school, they proved to be very promising pupils. Although the crimson stalks were scarcely larger than a pencil, they were ready for use months before the larger varieties with green stalks made their appearance.

The master determined to combine this little crimson rhubarb with the then commonly grown rhubarb, which is larger and has a very pungent acid, hoping thus to obtain something superior. So when blossoms appeared—tiny, greenish crimson, feathery flowers on tall stems—he made the experiment, but none of these seedling plants were up to the desired standard.

Then selection alone was continued from year to year; the one plant having the qualities he sought was chosen from among thousands of seedlings, until the Crimson Winter Rhubarb, which has made fortunes for so many small farmers, was obtained.

The process of testing for selection, in every case, requires the nicest discrimination; as so many points must be considered. Stalks from several of what appeared to be the most promising plants were numbered, cut, labeled and taken to the kitchen. Each was cooked separately that its flavor might be tested and compared, also the time required in cooking, the amount of sugar needed, and so forth. Each was served separately at the master's table. Fruits and vegetables are often thus tested in the Burbank home; sometimes each potato on the dinner table will be of a different kind, or corn or peas of a certain variety are served one day and another kind the following day that accurate comparison may be made. Every hour of the master's is made to count in the service of humanity; even guests as well as members of the household often have a part in deciding what fruit or vegetables shall be given to the world.

This test at regular meals is much pleasanter than the testing of fruit on vines or trees. Perhaps you think it would be great fun to accompany the master, as with a helper he goes rapidly along a row of vines laden with luscious ripe berries taking a berry from each plant and noting its flavor and quality. But you would soon become very tired of tasting and would wish you had brought a cracker or a few nuts in your pocket. Very few persons can stand this tasting of fruit for more than a few minutes at a time. Burbank, who is as keen in appreciation of flavors as in his observation of forms and colors, tastes rapidly and will continue the process for a considerable time. The process of testing fruits in the field is quite different as you can see from eating it at your leisure and for your pleasure.

Although the Crimson Winter Rhubarb was so superior in beauty and quality, a plant of greater size was desired, and selection was continued a few years, until the New Giant Crimson Winter Rhubarb was developed. This has been often termed "the mortgage lifter." No vegetable of equal value has been introduced for many years. It is welcomed as a winter and spring dainty coming early in the season when a mild acid is craved and fruit is scarce. Its beauty of appearance, its delightful flavor and its health-giving quality make it a general favorite. It will not stand the extreme cold of the north; but is readily grown in any mild climate. Carloads are each year shipped into the markets of the northern and eastern states in the early winter and spring from California and Florida.

The Crimson Winter Rhubarb in its new and improved form has returned to Australia to be grown in large quantities. It now flourishes in the royal gardens of England and Japan, and has made its way around the world.

## CHAPTER IX.

### THE LILY PUPILS.

WHAT a time they must have had getting acquainted—those fifty pupils! Some of them had come from the tropics and some from the Frigid zone. There were the tigers, the Alpines, the Auratums; and, I could not tell you all, for some were great strangers. But there were tall lilies and tiny lilies of every shade and color.

It had been thought such a difficult task to train the lily, that no one before Luther Burbank had given the subject much attention. Indeed, some had said, "It is no use—the lily cannot be taught." But he had faith in the intelligence of this favorite flower and believed it would respond to his love and care, and reward his efforts, even if it should require a great deal of his valuable time to teach it. The idea of the lily, of all flowers, not desiring a high education!

So here they found themselves in the plant school, in a most delightful California climate, where they could all be together in the open, and enjoy the fragrant breezes and the glorious sunshine, and just grow and grow.

Some of them had known little of outdoor life before, having been shut up in the stuffy air of a hot-house. Some had grown in the cold north, and others in milder climes. What a joy to revel in the blamy air and to drink in the dew, with no fear of being withered by heat or pinched with drought or cold.

Sweetest incense was breathed forth by some of them, while most of them had no odor at all.

They were an odd looking lot in form and color—no two alike. The California lilies felt their importance, we are sure; for they were at home, and all the others were their guests. Then, too, they were to assist their teacher, largely, in training the strangers to new ways. Little Miss Washington, courtesying low, was very proud of her fragrant white dress. Mr. Tiger, in his speckled brown coat, tried to be very entertaining, while the graceful brown lily chimed her mission bells. Miss Ruby, the tall, stately mountain lily, in her shellpink gown, bowed to each in turn, swinging her censer of perfume, which is said to be the finest in the whole world. Each tried to outvie the other in the reception of their



guests; for but one thought was there, and it was this: We will make them happy in their new home.

They all remained in the plant school at Santa Rosa until the primary work in pollination was completed, then the Gold Ridge grounds became their home.

This is a sunny, beautiful slope, away from the noise and tumult of the city, with blue mountains in the distance and carpets of wild flowers everywhere.

The school seemed already full of hundreds of kinds of fruit and flower children. These are the proving grounds, and one must be found worthy, or be suspended from the school. Two acres, however were given the lilies in which to receive their higher training.

Pollination here was a very great task, for thousands of lilies were soon growing from the seeds planted. Sometimes Burbank emerged from among them almost covered with brown and yellow dust, bearing in his hand a large quantity of the fertile grains of pollen for further culture. The planting continued until more than a million lily pupils were in the school.

In June, when the blooming season came, a rare mingling of odor permeated 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 cause. As they came nearer and nearer, such a mass of oriental 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 to behold their beautiful colorings and quaint forms, for nothing in the lily world could compare with them. Each lily seemed to do its best in appreciation of what the teacher had done for it.

Some had only one petal tightly rolled up; some had two petals like the wings of a gorgeous butterfly; others had three, four, or five petals; while most of them had six, as the other lilies have.

There were all colors, shading from white, or palest straw color, to the deepest yellow, orange, crimson or brown; and there were spotted and speckled ones—all mingling with the different shades of the green foliage. Their stems were from six inches to eight feet in height, some having a single stem, others branching ones. A few bore as many as fifty flowers on one stalk; and there was one that seemed to outdo all the rest in its profusion of blooms, for it carried

ninety-one flowers on a four-foot stalk. The bulbs were as great a study as were the blooms, differing greatly in color, form and size.

One of the best lily experts in the world said, upon visiting them, "I see here at least two hundred and fifty thousand distinct new hybrid lilies." What a great lesson in Nature's book of variation!

Out of all that vast array, Burbank selected fifty that came up to his ideal—that had rewarded his tireless labors by being obedient to his requests of 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? Here a plant six feet high with bright yellow blooms, beside it one only six inches high with darkest red flowers; farther on one pale straw, or snowy white, or with curious dots or shadings. Some deliciously fragrant, others faintly so; some with upright flowers, others with nodding ones; some with dark green, woolly leaves in whorls, others with polished, light green lance-like scattered ones.

"As the fresh dew-laden petals of these new creations, which had never been spread out to the light of day, were unrolled before me, a new world of beauty seemed to have been found, and a full recompense for all the care bestowed upon them."

The lily training still goes on with the fifty chosen ones. Sometime we may tell you about other wonderful children that come from this department of the Burbank plant school, for there are sure to be others.

## CHAPTER X.

### THE NEW ENGLAND GARDEN.

ONE of the first joys that came into Luther Burbank's life was his mother's flower garden. Here the bright butterfly-wing and the flashing rose-petal caught his childish eye, and he was quickly drawn into sympathy with the flower world. The mother used to tell this story of his babyhood:

"One morning, as his attention was directed to an especially beautiful blossom, a humming bird, on busy wing, began sipping its nectar from the fuchsia. In an instant the baby hands had caught and was holding the bird, while in a distressed tone he was crying, 'Birdie eat flower! Birdie eat flower!'"

When it was explained to him that the bird was not injuring the flower but only taking the food that nature had placed there for its use very quickly was it allowed to go unharmed, and ever afterwards the visits of birds, bees and butterflies became to the child an added pleasure.

As months and years passed, flowers were more and more his companions. In early spring he saw the bulbs, which had lain all winter apparently lifeless in the cellar, placed in the ground; then he watched the first tiny green shoots as they appeared above the surface. With eager eye he followed their growth each day until iris, golden daffodil, and scarlet tulip gladdened his heart.

He learned that the tiny seeds of the poppies, balsams, phlox, asters and other annuals were sown in boxes and carefully shielded from storm and cold until the soil had been warmed by the summer sun and the little plant had become strong enough to be transplanted into the ground, while the seeds of the hardier nasturtiums and sweet peas were early planted in the open garden.

The geraniums, fuchsias, heliotrope and other potted plants, which standing in the deep window seat, had bloomed all winter, were also set in the garden. At the same time he observed the swelling buds of the lilac, rose and jasmine, that had so valiantly withstood the cold of the New England winter. Much care and work were expended upon the garden but the labor was well repaid for all summer the harvest of blossoms continued.

Fragrant pinks, amid a mass of pale green foliage, red and white poppies, modest verbenas, time-honored sweet William, and drooping columbine welcomed

the flitting humming bird and the fairy-winged butterfly. Purple morning glories smiled a sweet good morning. Great glowing sunflowers, serving as time keepers, following the sun in his course across the sky; gracefully swinging blue and white canterberry bells chimed vespers at eventide, while all day long bright-faced pansies welcomed the guests to the home.

A clump of stately St. Joseph lilies, the admiration of all, occupied the center of the garden. Near by stood scarlet blushing peonies with bended heads. Velvety marigolds, little bee larkspurs, purple monk's hood, many colored zinnias, mourning bride, and bachelor button filled the space which was bordered with sweet alyssum and blue-eyed forget-me-nots. Along the walk were brilliant dazzling portulaccas and dainty snow flakes. Further back could be seen the freckled faces of tiger lilies, also tall stalks of hollyhock, set with rows of red, white, and yellow flowers. Near the gate a clump of tritoma with golden spikes stood like sentinels keeping watch.

In this home garden, no doubt, more seeds of industry, perseverance, and love of nature were sown in the mind of the child, than were scattered flower seeds in fertile soil.

When the boy became the naturalist the quaint old fashioned flowers of his childhood home were not forgotten, but were welcomed to the plant school in California.

Many of these flowers have been transformed through training until they are now almost unrecognizable. The flame-colored tritoma, which in the mild climate of California blooms in winter, has been combined with the yellow, which blooms only in summer and now there is a new class of tritomas of many colors which are almost constant bloomers, having a more graceful and less warlike appearance than their ancestors. Already they are becoming favorites for decorative purposes. The Chinese pink has, by constant selection, been improved in size and beauty of flower, and many new colors have been added. One presents a solid mass of snowy whiteness when the plant is in full bloom.

The morning glory and sweet pea have been under training. They have both increased in beauty, while to the sweet pea has been added a much greater fragrance than it formerly had. In the petunia class are seen many satiny-fringed flowers of the most beautiful rose pink. Dahlias, both double and single have received much attention at the Santa Rosa school and several distinguished graduates have gone out into the flower world.

The canna at one time formed a large class in the school. Cannas from

France and from Italy were mingled with the American varieties, and after many years of training and selection two exceptionally fine cannas were graduated, one having abundant spikes of rich crimson, another, clear yellow orchid-like flowers.

The bee larkspur in the New England garden was always in blouse of simple blue and was scarcely more pretentious than the wild larkspur which grows in the fields and by the roadside. Although many years had passed when larkspurs were admitted to the plant school the prevailing color of dress was still blue. The master wishing the friend of his childhood to don more pleasing colors, planted thousands of seeds and year after year selection continued until now the new larkspurs, as they are called, or delphiniums, stand as one of the most exquisite flowers. Among a collection of the world's choicest delphiniums these Gold Ridge graduates are unequaled. Red and blue, which in flowers is a very rare combination of colors, are delicately blended in its azure blossoms, which are many times larger and more graceful than of old.

## CHAPTER XI.

### THE SUNSET CLASS.

WHEN the amaryllis entered school the hardy ones, the ones that could live in the open, wore simple unattractive colors. Those that had lived indoors in conservatories were larger and more beautiful but were exceedingly fragile, and when taken into the sunshine they seemed famished, failing to be revived even when moistened with refreshing dew drops.

The most beautiful blossoms were only four or five inches across, having six quite narrow petals. The stamens were long, slender, and weak, the foliage, narrow. The bulbs, ordinarily, were about the size of small apples usually having one stalk to a bulb and two or three flowers to the stalk. A plant seldom produced more than one new bulb each season. Seeds were not commonly planted as it required from four to five years for a plantlet to mature, bloom, and prove its quality. The blooming period extended over a few weeks in early spring.

Some of the pupils came from South Africa, a large number from mild-tropical, and semi-tropical regions of Central and South America, while those from the conservatories were grown in different parts of Europe and the United States of America, but from whatever clime they were known by unpronounceable Latin names. There were *A. Johnsoni*, *A. Vitata*, *A. Regina*, *A. Gigantea*, *A. Sarniensis* and others.

These amaryllis pupils were patiently trained. It was eight or ten years before the master could observe much improvement, but when he fully understood their habits large quantities of seeds resulted. These were planted and frequently there were many thousand amaryllis pupils in the school at one time. The delicate hot house plants combined with those more hardy, and those with beautiful blossoms mingled with the dull uninviting ones.

When the master succeeded in producing a beautiful, hardy, vigorous class he continued to train for an earlier, larger, and more abundant bloom and to lengthen the blooming period. The earliest bloomers were promoted. Those that were the first and continued to bloom the longest won the prize. Still the teacher was not satisfied, his pupils must resist disease and ill treatment, and must pro-

duce many bulbs. Choice conservatory bulbs were sold at from one to five dollars each, consequently, only the wealthier people could enjoy the blossoms. The master's desire is that everyone may enjoy all beautiful flowers, so selections were made until many young bulbs were found on one amaryllis plant. Each of these new bulbs, when planted produced two or three strong stalks, and each stalk bore from three to six beautiful flowers which often measured from six to nine inches across; the thick wide petals numbering six to eight, were one to three inches wide, and amaryllis blossoms were enjoyed from early spring to mid summer.

Training for beauty of dress and variety of colors, shades, flakes and trimmings were considered throughout the entire course.

The master of the plant school prefers simple English names for his graduates and we are sure that every boy and girl who reads these stories will be glad he has given his graduates names that are easy to pronounce. There were so many in the amaryllis class of 1909, however, that he decided not to give them separate names but to number them, and to call them "The New Giant Amaryllis."

The farewell reception tendered the amaryllis class will be long remembered in the history of the plant school. The color scheme in the gowns worn by the one hundred and thirty-six graduates was beautiful beyond description. We have chosen to portray not the most exquisite but those wherein lie the greatest contrast. One wore clear, fiery scarlet with narrow, white stripes at the base of the robe, another, white, overspread with shadings of pink, crimson, and scarlet. There was a snow white dress lightly lined with crimson, also a dress of brilliant red. One was of fiery crimson with ribbons of white and another, clear, velvety carmine with broad, white bands. One scarlet gown was exquisite, having deep crimson and rosy shadings with crimson and white bands, and there was a beautiful flame red costume with blendings of faint pink and white. One costume was pure red, flaked with white, another was flame scarlet with short white bands.

A tall graceful graduate wore a rich shade of vermilion with bands of greenish white, while a shorter pupil chose white and pink almost evenly divided in pencilings, shadings and flakes.

A general favorite was beautiful in a unique suit, striped and shaded with rosy crimson, purple and white. Another, almost as popular, was gorgeous in crimson, slightly tinged pink, heavily banded, dotted and flaked with white.

One of the smallest graduates was beautiful in snow white, lightly laced and lined with crimson and edged with bands of crimson, while one, a little larger,

chose pure scarlet crimson with faint purplish shadings and short greenish white bands.

There was a bright, scarlet gown with broad bands and featherings of white, a velvety carmine with white bands at base ; and a pure white, beautifully, but slightly edged, and lined with shaded carmine ; a deep satiny crimson lake with undertone of scarlet and narrow white bands ; a white with tinge of Nile green, striped and edged with crimson ; and a light crimson, with undertone of salmon, shadings of deeper crimson irregularly striped white. All these gowns were beautiful.

Queen Rose attended the reception. Clad in all the beauty of a smiling spring she sat upon her throne of Nature's green with the blue ethereal arch as her canopy. Even in all her loveliness the Queen must witness the departure of a class unequaled in gorgeousness of dress, for since the establishment of the school no class had left its corridors in such splendid array.

When beholding a gorgeous sunset with its varied delicate shades and brilliant colorings one may catch a glimpse of that splendor which was woven into the gowns of the sunset class.



## CHAPTER XII.

### THE ENNOBLING OF LITTLE BEACH.

LIKE most wild plants, the Beach plum family had a hard, fierce struggle for existence, and its energies were taxed to the utmost. Some of them even had to grow thorns for protection; and others had to crowd together in thickets so close that it was hard to find an opening between them.

The eastern part of the United States was its home. It was called "Little Beach" there, because it lived near the shore that was sometimes submerged by the sea. It was also found on dry rocky soils as well; yet it managed to live and bear fruit under the most trying conditions.

The fruit which it produced was no larger than a cherry, and was mostly, pit, there being only a thin layer of flesh between the pit and the skin.

The ambition of this little, lean, skinny outcast was to be made tame, and to be better fed, so that it could grow to be plump and fat.

All that it seemed to have to recommend it was hardiness; and all it could do was to yield an abundant crop in the most trying time of cold or drought. Even though its fruit was almost worthless, it would show its willingness to be useful by doing its best.

Through all the years of work in his plant school Burbank has gone out into the open—in the mountain, valley, and forest—and sought out the little wildings that longed for a more favorable place for growth and development, and brought them in for training. His sympathetic heart went out to them, and his fine intuition told him which would respond readily to cultivation. Indeed, when only a boy, he sympathized with weeds, and wondered if he might not be able to improve them. He said, "Weeds are weeds because they are jostled, crowded, cropped and tramped upon, scorched by fierce heat, starved, or perhaps suffering from cold, wet feet, tormented by insect pests, or lack of nourishing food and sunshine. Weeds are plants out of place."

He seemed always to know which of these degenerates would prove grateful, and be willing to help the other pupils in the school. He saw in this hardy little savage an unselfish nature, and immediately set about preparing for its improvement and usefulness.

When Little Beach arrived at the plant school he was greatly surprised at the cordial welcome he received. The plum pupils and the prune pupils were especially glad to see him. Even the most aristocratic ones offered their hands, and smiled upon him. He admired their upright carriage, their fine glossy leaves, and, later on, their lovely white blossoms. He hoped that sometime he would look as grand as they, but he could not quite understand why his blooms were not out.

Then he heard the scientist say something about the other pupils and the prune pupils minding the frost, and that it kept them from bearing fruit in many places. He began then and there to feel his importance, for he knew all about how to resist the cold. His experience had been large on that line; and, then and there, he began to realize how he was going to be of use by teaching them new ways, while he was also receiving instructions from the master.

A month later Little Beach was a perfect snowball of bloom, when the Japanese plums and others had lost nearly all their beautiful white petals.

Then came the wise one to admire Little Beach's flowers, and also to impart to him the knowledge of his real worth, and to tell him what was expected of him in the future. From a few belated blooms of the Japanese plums some pollen had been dried, and great care had been taken to preserve its vitality. He now placed this pollen upon the stigma of the choicest of Little Beach's blossoms, and tagged them until the fruit should ripen.

The next season the plant pupils from these seeds made fine progress; and, when large enough, were placed upon the arms of a full-grown plum tree, along with the pupils of more distinguished ancestors, in the Gold Ridge grounds.

It was only two years from that time until this, the first generation, bore fruit, which showed such great improvement that Burbank knew there was a great future for Little Beach; but further crossing, or pollination, must be done, and he must continue to cultivate patience, which this restless little fellow needed.

Little Beach rejoiced, I am sure, when the fine plum pupils of the third generation appeared, for they were beauties to look upon, their fruit being larger, and very delicious. Many of them wore lovely, bright colors—red, pink and yellow—and one was clothed in a rich royal purple, flecked with white. None of these showed a trace of bitterness in the rich meat. And such plump, round bodies they had! Not one of them was a bit flattened, and none had the suture, or crease that other plums have. To his delight, and to the delight of his teacher,

they had erect forms, and beautiful, glossy leaves, and were possessed of a fine constitution. They would be sure to prove a blessing, especially to those who could not before enjoy the luscious plum because of a cold climate. He had now made it possible for the plum family, with its higher education, to be prolific everywhere.

Little Beach is considered a great hero in the plant school, and has become renowned; for he has been adopted, so that he may remain there permanently, and be of still greater use in the world.

## CHAPTER XIII.

### THE FIRE POPPY.

SOME have spoken of the poppy as gaudy, bold and flaunting; but this is an idea of the careless observer, for really there is a refinement and culture, to one who knows the flower, in the satiny sheen and delicate texture of the fabric with which she clothes herself. Among the ancients the poppy was a flower sacred to Ceres, and Ceres was the goddess of the fertile field, of sowing and reaping and of harvest festivals. We are so glad the goddess loved the poppy, for we think her a lovely flower child, and we know that Burbank loves poppies or he never could have succeeded in training them as he has.

Some of the poppy children had been in the school a long time. We have told you how Miss Eschscholtzia changed the color of her dress. Now, we will tell you how an entirely new poppy was brought into existence under the direction of the teacher of the plant school, and how Oriental and Opium, two poppy people, whose home was in far away Asia, proved their worth in assisting him.

These poppies were so widely different in their natures and habits, that it was contrary to all before known scientific laws to try to combine them. Oriental was a perennial, that is a plant growing all the time from year to year, while Opium was an annual and must be raised from seed each season. But when one says that anything in the improvement of plants is impossible, Burbank simply says, "Wait! Let us see about it!"

Opium had long borne a rather bad reputation, because of its furnishing a poisonous liquid, which brings ruin and death to those who habitually use it. But the master's work is not only to train good into his plant pupils, but to train out the bad; and he was certain that he should not have the accusation of being poisonous hang over the life of the new poppy; for with this flower he had planned to brighten homes everywhere. So he instructed Opium to cultivate only the good qualities which he wished the new poppy to possess.

When these two poppies, Oriental and Opium, were classified and settled in their department right across from the snowy *Crinum* lilies, that continually suggested purity, in their sweet spotless robes, they seemed to forget much of the scenes and work of their former lives in China and India, and to think only of the lessons to be learned in the plant school. Oriental missed Opium all through

the long summer and autumn, and, indeed, most of the year ; for Opium was only a short-lived spring flower. Whether her long sleep was caused by the influence of the juice, which she gave out to real people or whether it was the habit other spring flowers have, we cannot say ; but those who take opium made from the juice of this flower sleep a great deal and, in time, they care for nothing else, so are generally failures as human beings.

Oriental's leisure time, we may imagine, as it was in a new home, was spent in making new acquaintances among the many plant people, who were there from every land, also learning all it could and amusing itself as well.

The plant people are not deep thinkers, but none of them are entirely without ingenuity and wisdom. The Tulip poppy did some very cunning things that caused them all to rustle their leaves in laughter as if they were tittering and clapping their hands. The wind always enters into their enjoyment, and the wind can tell some of the most beautiful stories of all.

This was the trick of the Tulip poppy. When a bee lit upon her radiant bloom, she closed her two inner petals tightly together and held him fast, as you would catch a butterfly with your two hands. Mr. Bee then set up a furious buzzing, which grew louder and louder, calling for help. If the master chanced to be where the cry reached his sensitive ear, he sometimes unclasped Miss Tulip's hands and gave Mr. Bee his freedom, otherwise he must remain a prisoner until she chose to let him go. This was a funny way to send her golden horde of pollen to other poppies, was it not? But it was a good way, one of Mother Nature's ways, for when Mr. Bee escaped he was laden with the yellow dust, and, lighting upon another poppy, he left much of it there. Mr. Bee never seemed quite to understand this trick of paying for the honey he sipped ; for bees are always heard humming in the poppy place.

When the plum trees blossomed in a burst, Opium awoke from the long, long nap to greet Oriental with a wealth of blooms of many colors. Oriental was decked in scarlet, the large single flowers looking very attractive. Burbank chose one of the finest blooms and shook it gently over Opium's head, so that the pollen from Oriental's anthers fell upon the stigma of Opium. In this way the two poppies combined and the teacher looked with great interest to some wonderful new poppies as the result.

The next season the childish plants from these mixed seeds were of great variety in both form and color, and especially so was their foliage, no two being alike. Some had woolly leaves, some hairy ones, while others were quite

smooth. Some were a light green, others were quite dark. The flowers were scarlet, crimson, white, purple and yellow. The seed pods or vases differed greatly. Some of them were from four to six times larger than those of either of the original poppies others were scarcely larger than the stem that bore them, while the pod was wholly absent in some.

Have you ever noticed carefully the poppy's seed pod? If not you would be delightfully surprised when you placed it under a microscope. Any flower or seed vase to the tiniest wilding will disclose to you when magnified a fairyland of pleasure of which you never even dreamed. A flower, which you pass by daily unnoticed, under a microscope becomes as beautiful as an orchid, bedecked with diamonds or pearls. The orchid is said to possess the highest intelligence of any flower, and is certainly among the most beautiful. The dainty designs from Nature's looms are indeed wonderful. One, who has examined and studied carefully these, the "sweetest thought of God," could never willfully trample a flower under foot or fail to give a cooling drink to a thirsty, drooping plant.

There is no more interesting study than that of plants. Why not give yourself a nature exercise by examining the poppy vase? You will find the seed pod much like a pepper box, with holes not on top but under the brim that the seeds may be safely housed from the weather until they are ripe. Then you can shake them out as you would shake pepper from a box. If left, the vase will bend over and sway to and fro for the wind to scatter the seeds. Surely Mother Nature has had great intelligence to provide so comfortable and so beautiful a cradle for the seed babies.

Selection of the best offspring from the mixed seeds of Oriental and Opium each year, when the young plants reached the proper size, went on for many years before a gorgeous one in radiant beauty came forth, waving her large vermilion flowers on branching stalks, adorned with soft gray-green foliage, and bearing this message to the world:

"You may depend upon me to brighten your lives every month in the year. If you love me and wish me near you, I will divide myself for you. This is an easy way to place me in your garden, as I have few seeds to give you."

And, O, how we wish you could see these beauties as we first saw them—one great continuous bank of glowing, flaming red, with a clean happy brightness, beautifully fresh and newly varnished, as if an artist had just left them. Truly magnificent specimens of joyous planthood, filled with the perpetual fires of a vivid sunset—fiery vermilion, with a purplish black spot at the base of each petal—so it was christened "Fire" Poppy.

## CHAPTER XIV.

### THE NEW STRAWBERRY.

ABOUT thirty-five years ago a number of strawberry pupils from different lands entered the plant school. One came from New England where, no doubt, many Puritan children had feasted on the fruit of its ancestors. Another came from Alaska, the home of the little brown Esquimaux, while still another sailed over the broad Atlantic, then traveled by rail across the United States until it was so near the mighty Pacific, that the moistened breezes revived its drooping stalk and withered leaves. Its home was in Norway, "the land of the midnight sun."

Perchance this Norwegian plant pupil had sat at the foot of the Scandinavian Alps and listened to the rumble and roar of old Thor's brazen chariot, as it rolled from peak to peak.

These plant pupils were a long way from home, still they were content, for they received the best of care from their teacher. They were placed very near each other and soon learned the ways of the California berry pupils, which had been brought from the hills and valleys bordering the Pacific. There were also many varieties of cultivated berries varying in color from the brightest scarlet to white. They trailed their slender forms along the ground, their variously polished or downy leaves spread upward to take in the pure air and to catch the bright rays of sunshine, without which the food could not be digested for the use of the plants.

For many years cross pollination and selection of the best continued. When scarlet berries peeped from beneath the green leaves, badges of honor were awarded those plants that excelled in any particular. Still the ideal berry was not produced and it was finally decided to discontinue the task undertaken and give these berry pupils a vacation. Most of them were allowed to remain in the school, however, for they had become very dear to their teacher. In a plant school, as in a school for children, it is necessary for some pupils to remain longer than others.

After twenty years had passed a plant collector sent to the school some seeds of *Chiloensis*, a wild strawberry that grew on the high mountains between Chili and Patagonia.

These tiny seeds were sown in the kindergarten department of the plant

school, and after being promoted to Gold Ridge they were soon ready for a fruit test. They were found to bear very small berries but of excellent flavor.

In the school were strawberry pupils, brought from the sand hills near the coast. In their native home they are wise little plants, for they learned to protect their fruit by growing close to the ground. They sometimes even hide their red berries in the sand or under their leaves, so that children have difficulty in finding them; and only those who have learned their habits return from a berry hunt with baskets filled with the sweet juicy fruit.

A blending of these two new plants was undertaken and the master soon had a class of berry pupils ready for Gold Ridge.

The day for final examinations came all too soon. The teacher was disappointed for out of the thousands of plants under training not one had the desired qualities. So more education must be given.

Again the kindergarten was crowded and again the workmen were kept busy for many days during promotion season.

Gentle, merry, laughing Spring hastened rapidly by, but before she vanished smiling white-petaled faces looked out from beneath the green canopies of thousands of berry pupils. The day of selection finally arrived. Such a variety of red cheeked berries had seldom been seen. The master moved among his plant pupils with anxious anticipation. For more than thirty years his great heart had longed to produce a berry that would gladden the homes of rich and poor alike.

The search continued. Finally one was found. The ideal was at last attained. A plant bearing a most unique berry was seen among the thousands around him.

The leaves of this new plant are thick and firm and covered with silky down, well protecting the ripening berries from the hot rays of the sun. The stalks on which the berries grow are large and branching, and it is possible, in warm dry weather, for berries to keep a week on vines after ripening. The berries are large, firm and luscious, sometimes weighing an ounce each. They are a pale scarlet outside and a delicate yellow inside. The seeds, which grow on the outside of all strawberries, are so small on this new berry that one can scarcely notice them.

John Burroughs, the naturalist and writer, visited the plant school and when invited to taste these new berries, he exclaimed, "A most delicious berry, the best I have ever tasted!"

This berry has been named Patagonia. Its early training, with the proper environment, has developed it into one of the best strawberry pupils ever graduated from the plant school.



## CHAPTER XV.

### THE RAINBOW CLASS.

IN the little New England garden of Burbank's eastern home grew the old-fashioned gladiolus. This had a tall stalk with a number of small brownish crimson lily-shaped flowers forming a spike. The flowers were all on one side of the stem and bloomed irregularly; those that first opened were faded and dying before the slower ones greeted the summer sunshine. Thus the spike was never perfect, and the faded flowers had to be removed else the plant presented a ragged, untidy appearance.

Another unhappy feature of the gladiolus was its awkward stooping habit as if it were about to fall over or did not care whether it stood straight or not. Frequently it might be seen in the New England garden with a soft cord passed around it and on around a stake, but in spite of every suggestion gladiolus would not stand erect.

When the plant school was established Burbank chose among the many other flower friends of his childhood gladioli as pupils. He loved his old time friends and wished to teach them to overcome all their imperfections. To accomplish this he admitted many cultivated varieties from Europe, but these like their American brothers had weak stems, flowers too far apart on the stems and petals too delicate to withstand exposure to wind and bright sunshine. Large classes of European and American gladioli were formed and at the close of the term the assistants put white ties on those the master wished promoted.

In southern Africa other kinds of gladioli grew; although these were wildlings their brilliant colors and markings were needed to blend with their cultivated American cousins. These African plants were brought into the school, many were grown that the most beautiful and most perfect might lend their assistance to the master in training the stooping gladiolus to become more graceful and to produce larger and more lasting flowers of brilliant colors.

After a few seasons improved European, American, and African gladioli stood in long rows in the school and pollenation began. Selections of the best were made until the long slender stalk disappeared and in its place was a short strong stem so closely set with large beautiful flowers, as to be entirely hidden

from view. In cool pleasant weather, the first blossoms on the stem remained to say "good morning" to the last flower that bloomed. There were blossoms of distinct colors and blossoms of many hues and shades with brilliant markings.

For ten years gladioli remained in the school and during this time nearly a million young plants were grown from the seeds. But plants have enemies as well as people, and these enemies visit the plant school as elsewhere. Gophers became so numerous and destroyed so many bulbs that the master decided to graduate the entire gladiolus class.

He was sorry to part with his pupils but the sacrifice was necessary that the enemy be overcome. He gave his most beautiful graduates distinct names. One was almost double and wore a gown of deep pink, shading to white. This he named California. Another, white shaded with purple, was called Shasta; others received the names Santa Rosa, Yolo, Mariposa and other California names.

Although surrounded by beautiful flowers from all parts of the world and busy with fruits from every clime the master did not forget his gladioli pupils. So when at last the enemy was exterminated he determined to admit another gladiolus class.

Training at once began. He crossed and selected from thousands of seedings until the members of the gladiolus class became almost innumerable, still promotions continued.

In the Gold Ridge school now (1913) may be seen numerous long rows of gladioli. The plants, standing close together, present one solid line of foliage and flowers reaching from the roadway over the sloping hillside. They do not now need the stake of the New England garden for a support for the strong straight stem stands erect entirely surrounded by blossoms. The gladiolus pupils have been taught to stand erect.

To accurately describe the dress of these thousands of gladiolus pupils would be a study for the master. There are shades of delicate pink, flaming, glowing yellow, cardinal scarlet, royal purple, deepest crimson, dark salmon, orange scarlet, pinkish lavender, bluish purple, creamy white, carmine, amethyst, heliotrope, lavender and mauve. These exquisite intermingling colors, shades and tints seem to vie with those one often sees at evening in the eastern skies after the passing of an April shower.

## CHAPTER XVI.

### THE WAIF OF THE SCHOOL.

As Father Time has from century to century marched through Mother Nature's realm, reaping with his great scythe, many plant children have been down-trodden, never to rise again. Others, whose lives were intended by the Creator of the universe to be of lasting benefit to mankind, have been so jostled and crowded and bruised and broken, that they have taken on an armor of defense only to be shunned by civilization until some friend should come to their rescue.

Still others have been kept by man as mere curiosities and have been given grudgingly a home to satisfy man's greed for gain.

In the Burbank plant school we find all these classes of Nature's children assembled.

Prune Sans Nauyou, Half-pit, a little French outcast, was allowed a home in some of the large gardens of France simply as a curiosity, its peculiarity being the pit. Only about one half of the kernel was covered by the hard stone or shell. The open end of this pit was jagged and the hole was covered by the flesh of the plum.

The plum was no larger than a small cherry, the skin was tough and the flesh both sour and bitter. Little Half-pit was not sought for its excellent qualities.

Now, the master of the plant school, who sees "tongues in trees, books in the running brooks, sermons in stones, and good in every thing," became interested in Half-pit and admitted it to his school. It was given a place among the other plum pupils, but because its fruit was so small, its body and limbs so scraggy and crooked, we think it must have been discouraged at first.

Near Half-pit and in the great plum-prune class stood "Vesuvius," noted for her beauty of dress—for her foliage, her great leaves being often four or five inches wide and six inches long. The color scheme in this leafy gown was gorgeous, a beautiful dark crimson shading into light crimson and white. Both the upper and under surface of this leafy mantle was exquisite.

Poor scraggy Half-pit in crumpled green leafy gown was in the same class

with these gayly clad pupils; but in a plant school, we feel sure, there is no fun making or tittering when an illy-dressed plant waif is admitted.

The juniors and seniors, too, were largely plum pupils and perhaps Half-pit did not learn all their names at all for there were so many. There were America, Alhambra, Abundance, Apple, Bartlett, Botan, Burbank, Beauty, Chalco, Climax, Combination, Choice, Delaware, Doris, Epoch, Formosa, First, Giant, Glow, Gaviota, Gold, Hale, Juicy, Maynard, Nixie, October, Pasha, Prize, Pearl, Red June, Santa Rosa, Splendor, Standard, Sugar, Sultan, Sweet, Satsuma, Shipper, Shiro, Wickson, Victory, Vesta, Vesuvius, and Gee Whiz.

Some of these had been graduated before the waif came; we suspect that the little creature often longed to become large enough, straight enough, and cultured enough to receive this honor and perhaps also to become as sweet as Sugar and as beautiful as Gee Whiz or America.

After several years Half-pit began to understand the desire of the master and to know that the seed covering it had tried to keep was not necessary to its existence at all, but that it could be of more service to man if the half shell were entirely gone. Half-pit persevered, and about the fifth season after entering school many white blossoms appeared and the wise teacher brought yellow dust from the French prune, to combine it with that of Half-pit.

Soon little prunes that looked like green goose-berries took the place of the snowy blossoms, and as the morning moist-laden breezes bathed them, and the warm mid-day sunbeams kissed them, they grew larger, more beautiful and of brighter hue.

When the teacher came to examine the fruit he was greatly pleased with the result of his experiment; still success was doubtful for as in most other cases years of scientific selection was still required, necessitating the planting of thousands of seeds. Later, other crosses were made; sometimes pollen from prunes, at other times pollen from plums was used. Often the half-pits were larger than the original, indeed many of the young trees bore fruit with entire pit covering. The best half pits were usually saved for planting, although other desirable qualities had to be considered when selecting seeds. The new fruit must be sweet, large, and juicy. As many as five thousand descendants of little Half-pit were often in the school at one time.

Choosing the best of these for further education, would seem an insurmountable task to most people, but Burbank's unequalled power of selection, his matchless intuition, enables him to walk rapidly between long rows of any kind of

seedling trees and from their general appearance and foliage direct his workmen which to save.

Half-pit was brought into the school about 1887. In 1899 a descendant of Half-pit since named Conquest appeared. This was the first pitless prune ever produced by man. The work of perfecting this fruit has been carried on until now (1913) many varieties of prunes which have no hard stone are found in the plant school. There is, however, a tiny kernel in the most of these prunes which adds a rich almond flavor to the fruit. This kernel looks somewhat like the seed of an apple. In some of the recent prunes there are left only small fragments as if the kernel of an apple seed had been divided. This stoneless variety Conquest is about the form and flavor of the French prune commonly grown in California, but is larger.

Scraggy, sour little Half-pit can laugh with the winds now, as it beholds the surprised expression on the face of great and wise men, who visit the school and are given this new fruit and asked to cut through its center. Of course they consider it a joke, but when the pocket knife glides through unmolested in its course they adjust their spectacles and search for the stone that they think should be but is not there.

## CHAPTER XVII.

### THE VEGETABLE GARDEN.

“WE have it in our power to change the forms, sizes, colors, fragrance and numerous other qualities of flowers, the size and shape of the trees and plants which produce them, to increase the quantity produced, to make them appear early or late in the season and to make tender ones frost-proof. It is in our power, moreover, to mold fruits, nuts and vegetables, to almost any size, form, color, or flavor desired, to make corn, grain and grasses tall or short, and richer in starch, sugar, oil or other products; to increase the amount of sugar in cane, beets or other sugar-producing plants; to improve the flavor of tea, coffee, cocoa, cinnamon, cloves and thousands of other plants; to improve in every respect cotton, flax, hemp, and all other fiber-producing plants; and to increase the growth of timber trees. In fact to guide the plant forces with as much precision as we now do the mechanical and chemical forces and with even more striking results in the advancement of the race.”

How did Luther Burbank gain these great facts? Did he inherit the power to make plants more useful and beautiful? Did he get these principles from the great masters of science? Or did he learn them in the little garden of his childhood? This and the chapter, “The New England Garden,” tell of the environment where the boy Luther planned and dreamed the beginning of his life work.

Rows of currant bushes, bending with full clusters of scarlet berries, half-hidden by green leaves, graced either side of the thrifty vegetable garden in which the youth spent much time. Pulling weeds and hoeing corn tired the muscles, but the growing plants were a constantly changing panorama that taught beautiful lessons not to be learned in books.

When in early spring the sun warmed the soft, damp earth and it was made mellow and smooth by deep plowing and thorough cultivation, peas, beans, beets, carrots, turnips and onions were planted. The little tomato, pepper, cabbage and cauliflower plants were carefully removed from boxes or hot beds, where the seeds had been sown even before the earth's covering of snow had disappeared, and were placed in the ground now ready for them. How eagerly was their growth watched, each tiny new leaf being greeted with joy!

With exultant pride the first bright crimson radishes were pulled from the plot, where the lettuce as it peeped forth from the brown earth spelled in the brightest green—L-u-t-h-e-r. When, a little later in the season, the sweet corn was planted, the boy, like Hiawatha, would

“Go to wait and watch beside it;  
Kept the dark mould soft about it,  
Kept it clean from weeds and insects.

\* \* \* \* \*

Till at length a small green feather  
From the earth shot slowly upward,  
Then another and another,  
And before the summer ended  
Stood the maize in all its beauty  
With its shining robes about it,  
And its long, soft yellow tresses;

\* \* \* \* \*

And still later, when the Autumn  
Changed the long green leaves to yellow  
And the soft and juicy kernels  
Grew like wampum hard and yellow  
Then the ripened ears he gathered.”

Once when a large cucumber was found growing in a glass bottle, which had a neck barely large enough to admit the stem, no one inquired, for every one knew, who it was that had placed it in the bottle when the great yellow petals were falling and the tiny cucumber was just beginning its growth, and had, day after day, watched its development in its prison house of glass, as it lay hidden beneath a tangle of vines.

In the garden grew curious gourds from which were obtained nest eggs, water bottles and drinking cups. And the melons! Great juicy, pink-fleshed watermelons! Was there ever a boy who did not like watermelons? The muskmelons and squashes grew here also; but the great golden pumpkins were not allowed in this garden. They grew among the corn in the larger field.

He was fond of tracing his initials, with the point of a penknife, on the little pumpkins and of watching the letters increase in size as the pumpkins did. A circus parade passed by the field one day, and, as the pumpkins grew to maturity,

on them were seen in outline elephants, lions, tigers and other circus attractions. These pictured pumpkins caused much merriment and comment when exhibited at a county fair that fall. This, however, did not save them from serving as Jack-o'-lanterns at Hallowe'en. Those which escaped that experience were ready to be made into pie for Thanksgiving dinner. It was of such pumpkins as these that Whittier sang:

“O fruit loved of boyhood the old days recalling,  
 When woodgrapes were purpling and brown nuts were falling,  
 When wild, ugly faces we carved in its skin,  
 Glaring out through the dark with a candle within!  
 When we laughed around the corn heap with hearts all atune,  
 Our chair a broad pumpkin—our lantern the moon,  
 Telling tales of the fairy that traveled like steam,  
 In a pumpkin-shell coach, with two rats for her team.”

Here also grew rhubarb with broad green leaves, asparagus and celery, spicy peppergrass and various herbs used for seasoning—thyme, sage and summer savory.

This garden was the source of the old fashioned boiled dinner, once so famous in New England. A large kettle was placed on the fire and in it pieces of salted pork or beef. Later the various vegetables were added according to the time each required for cooking—beets, parsnips, carrots, cabbage, corn, potatoes, beans, peas and squash, the last three being placed in cloth bags so as not to become mingled with the other vegetables. All were served on a large platter and side dishes. The children coming home from school never forgot to seek the cold roasting ears laid away from the noonday meal for their lunch.

Many of these vegetables were stored in the cellar for winter use, crimson beets, yellow and white turnips, silver-skinned onions, great heads of cabbage, yellow pumpkins, and plenty of potatoes. Then there were jars of pickles and cans of tomatoes, also. The store of popcorn for the merry evenings around the winter fireside came from this thrifty garden.

Reliable seed houses, with attractive catalogues, from which seeds can be readily obtained, were not as numerous fifty years ago as now; so each year seeds were saved from this garden for the next year's planting. Seeds from the first large, ripe tomato, the finest melon, the most perfect ear of corn, a few of the earliest and best peas and beans were selected and in that way the quality of the vegetables was not only maintained but much improved; and something of the prin-



ciple of selection—the foundation principle of all plant improvement—was learned by the boy.

Experience taught the advisability of planting kindred plants some distance apart, that they might not “mix,” and thus the quality be impaired. The part played by the wind in carrying pollen from flower to flower, and the dependence of plants upon bees and other insects was also learned in this garden. No doubt even this early, Luther Burbank grasped many of the principles by which have been wrought great changes in fruits and flowers.

That plants are constantly changing, being influenced by their environment, adjusting themselves to external conditions, has long been known. Man has for ages unconsciously adapted plants to his wants. The leaves of lettuce and cabbage were used, and those plants having many closely packed leaves were chosen for seed until the result has been compact heads. Of turnips, carrots and beets the root was the desired part, and now only a comparatively small portion of the plant is above ground. The leaf stalk of rhubarb is used, the blossom of cauliflower, the bud of the artichoke, the fruit of the tomato, melon and squash and the seeds of beans and peas. By selection each has been induced to emphasize the part desired.

The task of directing scientifically and systematically these great forces of nature was left to Luther Burbank; and the result has been an almost undreamed of control of plant life. Something of the inestimable loss to the world by the raising of plants not well adapted to the use of man, has also been made evident.

In fact, more advance in plant improvement is now being made in a decade than formerly in centuries, yet the master of the plant school says this work is still in “its earliest infancy.”

## CHAPTER XVIII.

### WHERE THE BROWN NUTS FALL.

WHEN Luther Burbank was a boy his father, Samuel Walton Burbank, was engaged in the manufacture of brick, and owned not only his cultivated farm but also a large acreage of woodlands.

In these woodlands men were employed during the winter months felling trees and preparing wood which was used the following summer in burning the great kilns of brick. Many times each winter, in the large wood sled drawn by Chub, the faithful family horse, the father visited the woodlands. He was often accompanied by his two little sons and their baby sister, all in warm coats, mufflers and mittens, and snugly tucked in with a big buffalo robe.

Even before the open fields and pasture lands had been crossed, shouts of childish glee fell upon the father's ear and perchance each boy was seen scudding the roadway holding to the back of the sled with one hand, and in the other flourishing a ball of snow; while Trip, the pet dog, barked and frolicked as he joined in the winter's sport.

The way led across the ice covered meadow brook, through the now leafless huckleberry and blueberry bushes, where so often during the summer, pails had been filled to the brim with sweet plump berries; then up the gentle slope of Pine Hill, the sled moved slowly on, cutting its way almost to the frozen ground, through fleecy flakes of snow, under the overlapping branches of oak and chestnut.

Again in springtime the children, with their father, visited the woodlands. The spruce and pine had early put on their new spring trimming tips of light green and, being in a joyous mood, sang a song of springtime as the wind played among their slender needles. The oaks and birches on the hillsides had long since awakened from their winter's sleep and were joyously waving their beautiful fringe-like pollen blossoms in the breeze.

But the time ever to be remembered by these New England children was the purple hazy days of Indian summer, when autumn robed the trees with richest tints. Days when after the first frosts Chub was harnessed to the cart and with baskets in hand in which to gather the fallen hickory nuts and chestnuts, the chil-

dren climbed in beside the father, calling Trip to follow. The sandy grass grown roads through the woods were hidden beneath a carpet of intermingling shades of russet, scarlet, crimson, and gold, while through arches of oak, maple, and chestnut the sun cast a checkered light upon the rustling leaves.

Occasionally a gentle breeze caused a shower of glistening nuts from the opening burrs, which were hailed with delight by the children. Trip ran to and fro, now and then halting at the foot of a tall tree to make known in his own expressive language the presence of a bushy tailed squirrel among its branches. Then Chub, as if understanding it all, slackened his pace and three happy children were soon seen scrambling among fallen leaves searching for the little brown nuts. Sometimes the burr itself with its three nuts snugly encased lay beneath the rustling coverlet, and busy fingers were pricked by the protecting spines.

On these excursions the father told stories of plant and animal life, directing the children's attention, not only to flowers and trees, but also to the woodchuck in his burrow, to nests of birds, and to squirrels with their store of nuts and acorns in hollow trees.

Luther, the older son, was ever anxious to learn more of Nature's ways. He made careful observation of bud and branch. The pollen blossoms of oak and chestnut were to him the pages of an open book; these he studied and mused long on the lessons they taught. The slow growth of walnut and chestnut trees was noted. Watching the wood choppers making axe handles from hickory wood, he saw that they chose the "pig walnut" because of its superior strength although the "shag bark," the nuts of which were larger and better, was also valued for timber. He learned to distinguish the varieties of timber by the wood fiber, and habits of growth, as well as by the nuts. Thus the mind of the boy was both consciously and unconsciously storing knowledge that was to ripen into golden fruit in after years.

In the home were books descriptive of plant life; these were read and re-read, ever with the desire to know more of the life and habits of the plant companions. A cousin, who was a student of science and a personal friend of the great Agassiz, became interested in the questioning young mind, and although several years the lad's senior, the two became fast friends, and companions in the study of the treasures of meadow, field, and forest.

Years passed, yet many questions of plant life remained unanswered in the mind of the youth. Not until after the plant school was established at Santa Rosa, California, were these questions of such vital importance to the world

solved. Then they were answered by the mind of the master through the slow but accurate process of experimentation.

The American chestnut of the father's woodland farm was not forgotten. It was early given a place in the plant school. The trees were of considerable size but produced very few and small nuts which were, however, of most excellent quality. It required from ten to twenty years for a tree to bear when grown from seed. The desire of Burbank was to perfect his childhood friend.

In Japan grew a kind of chestnut tree, which, though smaller than its American brother, produced a larger nut, but the nut was of a poorer quality, being coarse grained and not as sweet as the American chestnut. This Japanese chestnut was admitted to the school and a combination of the two was effected.

As time went on thousands of seedling trees from this and other similar chestnut crosses were in training at the Gold Ridge school. When the first young trees ripened nuts, selection began. The nuts from trees producing fruit at an early age were usually saved for planting, although other traits besides early bearing were considered. As the different classes came forward for inspection, progress along many lines was noted. Trees becoming more compact and at an early age bearing larger, handsomer nuts which were of a better flavor were promoted.

Much expense and years of patient waiting were given to the chestnut pupils. At last trees were found in the school that produced nuts at eighteen months of age. These trees and nuts have the best qualities of the American and Japanese chestnut combined.

If the large sweet nuts from these beautiful compact growing, and early bearing chestnut trees gladden the lives of boys and girls as did the little brown nuts growing without care in the New England woods, the master will be content.

## CHAPTER XIX.

### CALLA'S STORY.

THIS is the story of the Calla. She told it one day to her friends as they rested in the shade of the trees. It was near Eastertide and the whole circle of flower students were interested for they knew that it is at Easter the Callas are most sought.

"We were not always so graceful as we are today," the story teller began in a low soft tone. "Ages and ages ago when our ancestors lived in the wilds of Africa we had only a long yellow spike to make us beautiful. This was surrounded by a number of separate broad green leaves much as other flowers are. After a while one of these leaves grew larger and gradually folded around the spike forming a flower cup. It took many, many years to make this change for Mother Nature, who is our teacher in the wilds, works very slowly. Our pollen needed protection so we persevered. Then we wanted to attract the insects so they would carry our pollen to other spikes. Nature taught us to change the color of the green cup to white.

"Some of my relatives, however, chose pale yellow as their color, while others preferred dark yellow or orange.

"I was the first calla to enter the school," continued the speaker. "I am known here as 'White Calla,' but by many people I am incorrectly called 'The Lily of the Nile.' You see I am not a lily at all for lilies have six petals which bend gracefully from a central stem.

"The master has trained many of his calla class to produce very large blossoms. This he does by selecting year after year the largest of our number for promotion. As a reward for his labors one of our class succeeded in producing a blossom ten inches across on a stem six feet high. So far as we know this is the largest calla that ever graced a stalk so tall, and we are proud of our class record. We feel like challenging the world having size, grace and beauty the points at issue.

"In another class of white callas which we call 'the little gems' the Master trained for small flowers and short stem. Each year he chose as the graduates the very smallest and most perfect callas. At last a regular Tom Thumb was

found. A perfect white blossom less than two inches across, grew on a stem about ten inches high.

"But by far the largest number of callas to enter our school were the wild tribes from southern and central Africa. They were a curious group when they arrived. *Calla Hastata*, *Pride of the Congo*, was adorned with pale yellow blossoms having dark yellow spots. *Ellitiana*, from Cape Good Hope, had large golden yellow flower cups and green foliage spotted white.

"The blossom of *Rehemani*, the pupil from Natal, might be compared to a coat of many colors, the outside being a delicate pink, the lining a rose purple, with bright crimson shadings.

"*Albo-maculata* was one of the smallest of these foreign pupils. The flower was a greenish yellow with a spot of dark crimson at the base.

"*Nelsoni*, from Cape Town, produced a very small yellow flower shaded with purple. The delicate foliage was sprinkled with yellow dots.

"Our master placed all these in one great class and began training by pollination and selection.

"A few years passed rapidly by, then a gorgeous array of callas were seen in the Gold Ridge school. They mingled together, drinking in the golden rays of sunshine by day, and filling their cups with silvery moonbeams by night. Myriads of stars, too, blinked as they gazed upon this strange assemblage of Nature's children.

"They were of many forms and sizes; some were tall and large, others, short and small, some vigorous and strong, others fragile and sensitive. In color they were from nearly pure white or light yellow through all the intermediate shades to dark yellow; also purplish and crimson. The foliage was even more varied than the blossom. There were large leaves, and small leaves; hairy leaves, and smooth leaves, green leaves striped with white, spotted and mottled in brown or variegated with intermingling shades of purple. The master walked among them, sometimes, in almost speechless admiration.

"Our school is justly proud of this class for from these wild African plants have been graduated many callas that are strong and will flourish in the open, in any semi-tropical climate. The blossom of each calla graduate is indeed beautiful, each being in itself a study. The foliage of some is a bright green with golden spots, others have green foliage spotted white, while still others have only the rich green of the white calla.

"Lemon Giant is one of the noted graduates, and Fragrance, a beautiful white calla, has attracted the attention of florists all over the world.

"I crave your pardon," said modest calla as the story was finished, "I did not mean to talk so long and to give undue praise to the great calla class but I do want to lead you to understand the training we have received in the plant school."

## CHAPTER XX.

### THE FIRST PUPIL.

WHILE Luther Burbank was yet a young man in New England, he purchased land and devoted a few years to market gardening. In this garden there was a plot of Early Rose potatoes, which as is the habit of this variety seldom bore fruit from the blossom, as did most other kinds of potatoes at that time. Most grown folks now, who were children then, remember that this fruit was called the potato ball, and many were the children who picked the fruits and played with them.

In the summer of 1871 as the young man was walking through his garden one morning, he saw among the foliage of one of the potato plants a seed ball. He had early formed the valuable habit of close observation, else he would have passed this by unnoticed, for it was the only fruit on the whole acre of potatoes.

He had known, from childhood, that when seeds are planted, either from the potato or almost any of our best orchard fruits, one is likely to get a better or a poorer variety than that planted; for seeds from these plants seldom come true.

He determined to save this lone fruit and plant the seeds hoping he might succeed in raising a new and better kind of potato, so he watched with impatient eye its ripening. But when the vine turned brown and the fruit was almost ready to break from the mother plant, he missed this treasure. He searched day after day and when had almost given up the seed as lost, he found it some distance from the vine. It had probably been broken off by a dog running through the patch.

This seed ball contained just twenty-six seeds. Burbank carefully saved them until the following spring. He planted them but must wait through the long summer months for the vines to grow and the tubers to form.

When they peeped through the soil there were just twenty-three young potato plants. They were often visited and accurate observations regarding rapidity of growth, height and size of stalk; shade of color, shape and number of leaves, etc., were made. Each plant was carefully labeled and numbered.

When it was time to dig the potatoes he found a few tubers in each hill. They were of different sizes, colors and shapes. Some were about the size of a hen's



egg, others as large as an ordinary potato. The potatoes in hills numbered fifteen, and seventeen were much better than the rest. The tubers of number fifteen were the largest, of uniform size, and were pure white, and together weighed three and one-fourth pounds. There were twenty-three new varieties but only seven of these were saved for future planting; all the others have been lost to cultivation. Some of these, by further trial, might have produced potatoes of importance. One that was discarded was bright red, one was pink, another pink with white eye brows, while in another the eyes reached nearly to the center of the potato. Today the master would save all for further training.

An agricultural fair was held in the neighborhood and Burbank decided to exhibit his products. A long table was reserved on which he placed some of the finest beets, carrots, cabbages, pumpkins, squashes, tomatoes and watermelons that had been produced in the Bay State, and the tall stalks of corn bearing great ears and towering above the table were far better than those raised by the Pilgrim fathers under the direction of Massasoit.

The mother, from whom Burbank inherited much of his love for nature, brought bouquets of beautiful flowers and placed them on the table among the vegetables. Early in life the originator of the Shasta daisy was taught, by a loving mother, to care for flowers.

Glasses of transparent jellies, jellies of crystal white, and ruby red, also jams of various kinds from the mother's winter store were arranged in pyramids among the gardener's displays. But the exhibit that most attracted the curious as well as the scientific observer was seven plates each containing the product of one of the seedling potato plants that Burbank had so carefully tended.

One of the greatest seedsmen of the United States was invited to visit the fair and to deliver the opening address. In the course of his remarks he referred to the seven plates of seedling potatoes and to the possibility of their development, predicting for the producer a brilliant future.

At the close of the program Burbank was introduced to this man of note. The seedsman enquired how he produced the potatoes and offered to buy number fifteen if, after further trial, it proved as good as it then promised.

Cultivation for testing and to increase the stock continued until the fall of 1875 when Burbank sent to the seedsman the potatoes he had raised from number fifteen and received for his new product one hundred and fifty dollars. The seedsman christened the new potato "Burbank" in honor of the originator and kindly allowed the young man to keep ten of the tubers.

Burbank did not get rich from the sale of his potato, but let us see what the habit of observation and the diligence of one young man has meant to the world. A gentleman connected with the United States Department of Agriculture at Washington, D. C., many years ago made the following statement:

"The Burbank potato has added to the productivity of the country \$17,000,000," and some one has calculated that if all the Burbank potatoes raised in one year were placed in a row, end to end, touching one another, the line would be long enough to make three rows of tubers from the earth to the moon.

After selling his potato, Burbank decided to leave his home in New England and seek a climate more favorable to the work he most enjoyed—plant experimentation. With the hundred and fifty dollars received for his potato he purchased a ticket for the Golden State and brought with him the ten new potatoes for trial in the West.

He engaged in the nursery business for a few years, but through these years he did not forget the precious seed ball nor its progeny; indeed by the time the plant school was established people over the greater part of the United States were eating Burbank potatoes and the Eastern seedsman was laying up treasures in a banker's vault from the sale of this world renowned product, while the name "Burbank" was becoming a household word in other lands.

It was early discovered that this potato would withstand the blight better than other kinds and as this disease had been at times prevalent in Ireland since the great famine in 1846, this variety of potato was hailed with delight in the Emerald Isle; for the potato is one of the principal foods of the Irish peasants.

The potato was one of the first pupils admitted to the plant school, and such peculiar little strangers one seldom sees as those that come from South America, the native home of the whole race of potatoes. One of the collectors has sent tubers of many different shapes and colors, pink, dark red, purple, black, brown, yellow, and white, some of these have very curious habits.

We usually see potatoes grow in a hill, snugly packed close to the parent stalk, like eggs in a nest; but this has not always been their manner of growth. In the wild potatoes have the underground stem longer before the end thickens to form the tuber. They were taught the habit of growing tubers close to the plant by man, who has chosen for food and planting the ones that grow close together. In some parts of South America the natives are so lazy that they have dug from the wild plant only the tubers near the parent stalk, and, as they do not cultivate them, the other potatoes at the end of the underground stem are left to grow.

This is one cause of the peculiar rambling habit of wild potatoes. A plant will perhaps produce tubers eight or ten feet in different directions from the main stalk, if placed in rich, cultivated soil. The collector laughingly remarks, "We have to herd our potatoes as we do our cattle."

The master of the plant school has had many different varieties of South American potatoes in training, as well as varieties from Arizona and Mexico; he has raised ten thousand seedlings from the Burbank potato but has never yet been able to educate a potato to surpass the snowy tubers produced in his New England garden.

The people of Massachusetts in the neighborhood of the market garden of so long ago are now preparing to erect a monument to the Burbank of Science on the spot where originated the potato that has so greatly increased the food supply of the world.

## CHAPTER XXI.

### BRAMBLE'S STORY.

ONE evening in summer, after lessons were over, the pupils were seated around the warm glowing fire of the great setting sun. They were tired and to rest themselves began to tell, one by one, the stories of their lives. Several related very interesting tales, then Bramble began.

"I was the first rubus to enter school," said he, gracefully bending a long slender body as if to salute his classmates. "My home, and the home of all brambles, was for ages in the forest. We had a hard struggle to live for the mighty oaks, pines and redwoods crowded us and stole our food until we were driven into the thicket. We greatly enjoyed trailing over the banks of woodland streams, but when forced to leave these cool places we sought the open, and if a friendly fence kindly offered support our slender arms clung to the long rough rails thankfully, for our ripening fruit could there enjoy the sunshine.

"All the boys and girls liked us and eagerly looked for us; for they said we were much better at heart than our aristocratic cultivated relatives, the blackberries. My! how those girls scolded at our little needles when they took our fruit. I know our thorns are sharp like daggers but we have, for a long time, been obliged to carry them for protection; for great bands of cattle and sheep used to lay waste our homes. Crowds of men, too, used to fall upon us and trample us under foot. Had not my people carried many short sharp swords I am sure we should have all perished.

"One flowery dewy morning in spring a strange man called on us. I never saw any one like him, he was in sympathy with us for he looked us all over carefully, and did not scowl at our stickers; then he took hold of me, put a shovel under me, and carried me off bodily. I did not know where I was going; but I felt very safe. His kind touch gave me courage and confidence. Playmates, you may be surprised that the strange man was our present teacher, who has trained us so long."

"Now, Siberia," said Bramble, who had made this long speech, "tell us your story."

In a low whispering voice, like a gentle south wind, Siberia began. "My old

home is in far away Asia. I love my native land, let me tell you, but there we Siberian brambles had to fight for our lives just as you American brambles have done. The people of my country did not care for me; they called me "seedy." I was so very small they banished me from their gardens. I am glad to find in my new home one who makes me welcome."

Early the next morning the air was so pure, the sunshine so refreshing, the birds sang and called so merrily to their mates that all the brambles decided to put on their white summer blossom trimmings. Soon fairy winged butterflies fluttered, and humming bees crooned around them. Then the master came. He visited Wild Siberia first and got some of the golden pollen. This he took on a watch crystal and put on the blossoms of the bramble.

When the plants which grew from the seeds of these blossoms were old enough hundreds of snowy petals fluttered in the breeze; but when the master came to examine them, he found that they had dropped their snowy blossoms and there was no fruit to reward his labors. It seemed as if the brambles were useless after all and should have been left in their forest homes.

The master decided, however, to give them a second trial the next season. Again in fruiting time every young berry pupil in the school was carefully examined and as there were many thousands it required much valuable time. Just as the diligent instructor was about to give up he found one berry pupil that was worthy of promotion.

You boys and girls who read these stories ought to be glad that in your school so many of you are sure of promotion, for in the plant school many hundreds, yes, even thousands, of plants try and fail. Only one little bramble passed the final in this severe work. But never a plant pupil was discouraged.

The new berry which resulted from the cultivation of the bramble was large and juicy, about the size and shape of the evergreen blackberry and very dark in color. Vines were grown from seeds of these new berries that gave fruit earlier than any other known berry; and still more, they continued to bear throughout the summer and were very productive.

This proved to be an entirely new species of *rubus*. None like it ever existed before, so Burbank named it "Primus," which means the first.

It usually takes many generations of plants to fix a new fruit, but this new berry from the wild Siberian raspberry and the wild dewberry of California, sometimes called the trailing blackberry, many thousands of seeds were planted

and every one came true, bearing Primus berries, proving that the species was fixed.

Thus through skillful training two wild brambles, with uninviting qualities, have been made useful, and another creation has been given to the world.

## CHAPTER XXII.

### THE WILDING.

You will remember that *Heuchera*, the little wild geranium, came into the school at the same time the flowering currant entered; but you did not hear how the geranium came to be found worthy of a place there. You will be quite interested to know *Heuchera* more intimately, we feel sure; for she has developed a fine character through the training she received and she is now very distinguished.

She was hanging over a mossy bank above a mountain stream near the geysers, about fifty miles north of Santa Rosa, when the master found her. The flowers, which remain beautiful a long time if placed in water, were all dried up; and the leaves had turned very red. She seemed to be getting madder and madder, because she could not reach the clear, sparkling water below. There is a law in the plant world that chains them to the soil; and this is one of their greatest difficulties, for it makes them so helpless. Perhaps hanging there a long time had affected her; for you know if you hang with your head down, you get very red in the face. Still she might have been only embarrassed. At any rate, it was a real kindness in the master to rescue her from her perilous position.

"Almost perished for want of a good drink, that you have tried so hard to reach but could not, you poor thing," he said. "Not even strong enough to make your wants known. You shall have a drink right now, and plenty of refreshing showers, when we get home. Then we will see what you are good for. You must have been very beautiful when you were in your prime. You are a child of the early summer I see." And he who believes a weed is but an unloved flower carefully disentangled her rootlets from the mossy bed, and examined the one crisp leaf, that showed something yet of its former richness and delicate tracings.

That was how she came to be in the big sack with the currant and other wildings. She was too weak and timid to tell this to them, and, although she was greatly refreshed from the cool drink, she had neither strength nor courage yet to hold up her head.

But it was not long before this strange little wild beauty was wide awake and cheerful, growing thriftily to express her gratitude for the gentle mist that was sprayed upon her daily. The exquisite colorings of her gown, light green,

red and brown were the next season in all their fullness; and she proved to be a healthy, hardy child of the wildwood, one that was quite sturdy and willing to flourish.

Her flowers were minute and dainty, and their airy loose panicles were very graceful. They were often given folk names or pet names by the country children, such as "coral bells," and "rosy morn," when they gathered them from their native haunts in the shady woods on the way to and from school. Once a year a "wild flower day," is held in many of the schools, when the children strive to excel in the number of kinds they can gather for the exhibit. These dainty bells are generally in evidence at that festival.

The master knew there was a bright future for little *Heuchera*, as an ornamental, or foliage plant. With her richly colored, finely veined leaves he was sure she would excel, so he placed her in that department, and her training for that purpose began.

Selection alone, the prime method, which plays the all important part in plant improvement, was used. Seeds were sown and the best of the thousands of plant children were chosen. At each visit of the master, *Heuchera* was encouraged to deepen the tints of her gown and, especially to adorn it with more frills, and each time he found her increasing in loveliness, showing her to be obedient and studious.

Nature is never in a hurry, but the master's endless patience and perseverance sustained him till Nature at last gave him a victory; for *Heuchera* has the most exquisite and most highly colored foliage, as well as the most complicated leaf of all flowers. In this humble little plant, Burbank, the idealist, not the dreamer, saw the poetry and beauty of floral wealth and wrought it, as no poet with pen or artist with brush could, into a new life.



## CHAPTER XXIII.

### THE BIRDS' FEAST.

It was one bright morning early in autumn that the workmen of the plant school were attracted by an unusual chatter in one of the walnut trees on the grounds.

"Ah, I see," said the master when he came on his rounds. "you birds have found my paper-shell walnuts." And sure enough as he came closer he saw a pretty nut-hatch "auck, auck- aucking," and then burrowing with his long-pointed bill into the thin-shelled walnuts, newly developed, and now growing on a small tree. "I see," he repeated to himself. "I've made those shells too thin." Then he realized that the birds were having a veritable feast.

A big, flashily-dressed yellow hammer, forgetting his busy task of "thwack, thwack, thwacking," on the barn eaves, had come to see about the discovery of the nut-hatch. From his hunting ground among the thornless blackberry bushes the towhee came calling "chewink, chewink, chewink." Three catbirds, being attracted by the noise, flitted to the walnut trees and soon cried out "zuay, zuay," while two sap-suckers, which had been the lone occupants of the walnut plot, before the nut-hatch made his discovery, circled around the trunk of a large tree, one after the other. They occasionally stopped to listen to the din caused by a number of jays fishing about screaming and scolding excitedly their "ike, ike, ike," seeming to say, "At last we have found the prize, we can get the walnut kernels now."

The woodpecker was the wisest bird among the visitors for he ceased his k-rah-ka and darted off to a nearby grove with a walnut in his beak, no doubt in search of a dead tree trunk in which he could lay up his winter's store.

The master stood for a time watching his little feathered friends. He did not want to harm them for they are very useful in destroying insects that injure the trees and fruits, but he finally decided that he would have to train his walnut trees to bear nuts with thicker shells although it took him many years to train a tree to bear such thin-shelled nuts.

Years and years ago most of the walnuts were brought into California from France, Germany and England. At that time nuts were considered unwholesome.

They were not eaten as daily food, for those then offered for sale, in the stores, were tough, the kernel was sometimes covered with mold; the skin over the kernel was dark and contained a large amount of tannin, a chemical substance used in tanning leather. This tanning caused the mouth to smart and burn when the nut was eaten. But worst of all many of the nuts had worms in them and could not be used at all. The nuts then raised in California were of different sizes and shapes and many contained the puckery tannin.

While investigating this subject in search of a better nut to train, the master heard of a tree in the business section of San Francisco which bore delicious nuts in abundance. The tree was to be immediately destroyed as the ground was needed for building purposes. He purchased the last crop of nuts which this valuable tree produced every one of which was planted.

The trees resulting were mostly quite ordinary, but two or three bore nuts in many respects even better than the nuts produced by the original tree. From the best two of these trees many more were raised. Among these, two still better ones appeared. By continuing this process for a time a tree was produced which yielded nuts when only three years of age, and every succeeding year, its limbs were full of fine sweet nuts, which were almost round. The shell was very light colored and very thin. The skin covering the meat was pale yellow, almost white, and contained none of the puckery tannin found in the older varieties of nuts.

This nut ripens a month or more before other walnuts are ready to harvest. In the coast counties of California where there is much fog it is sometimes subject to blight like most other walnuts, but being so early, so delicious, so fine in appearance, and the trees so very productive it is a standing living manifestation of what selection alone can do.

Thousands of walnut trees are now growing which have been grafted to the "Santa Rosa Soft Shell."

The "ka-rah-ka" of the woodpecker and the "ike, ike, ike" of the blue jay are sometimes yet heard in the walnut trees although the master chose, for grafts, those with somewhat thicker shell than the first produced.

## CHAPTER XXIV.

### THE ROSE AND HER PART.

"OH, the rose, the rose, the queen of the garden, has come!" chimed on the soft June air. Every flower child danced for joy, and every fruit child waved its arms in a welcome greeting.

Yes, the queen was there, the dear queen, *Hermosa*, still wearing her pink gown, looking a wee bit old-fashioned, to be sure; but as sweet and profuse in her offerings as ever she was.

People learned to love *Hermosa*, long ago, and even now with such a wealth of roses of all shades and colors, no garden seems complete without her. True, her blooms are quite small, sometimes, but there are always so many of them to make up for their lack in size. But you do as the director of the plant school does and watch the effect. He is always mindful that the plant people have plenty of room, plenty of rich soil and all the sunshine they need, so that they can grow as children do, who have a good, big play ground and plenty of wholesome food.

*Hermosa* came into the school on a special mission, for a new rose had been planned by the master—a rose for everybody. Her ever-blooming quality was one of the leading elements needed in this new creation. *Hermosa* is probably the best known of any one in the entire rose world; but, as she rarely produced seeds, no one up to that time had tried to improve her.

You probably know that the rose family is a very distinguished old family, and also a very large one. We cannot tell you where the first grandmother rose came from, but a great many of the roses of today came from the far east. So the first rose may have lived in the Garden of Eden, though whether she was a tiny little plant, a vine, a shrub, or a great big tree we cannot tell you now, or whether she grew thorns or not, for it was so long ago. Some believe firmly that a cousin of the rose, the apple, was a resident of that garden.

We are told that to be an aristocrat in the plant world is to be a descendant from a long line of plants that have kept on improving; so the rose, it seems to us, must be an aristocrat. This, we know, the rose is the emblem of beauty and delight and that the rosebud is a figure or symbol of innocence and purity. The

school was greatly honored in the advent of the rose, and there was no wonder a quiver of joyous excitement went through the garden when she entered.

After Hermosa other roses came to assist. Among these was Bon Silene, noted for the beautiful form of her buds and for the profusion of her blooms, which were a deep rose color shading to carmine.

Hermosa, like all plants, wanted to grow and bear seeds; and, like them, all she asked was to be made comfortable. The more we study plants the more we admire their ways of attaining success, and the more we respect their likes and dislikes. Roses are especially fond of rich loam, and you may be sure that they received this as well as all aids to successful improvement in the plant school. They were not crowded in the least nor choked by greedy plants. They are rather fond of small flowers at their feet, but nothing must shoulder them. These are among the likes and dislikes of the rose.

The few seeds, which Hermosa gave as her first offering to the master, were planted with great care; and when they felt their coverings becoming moist, the seed babies began to think of awakening and stretching their limbs and, perhaps smiling and yawning and cooing, as real babies do.

It was not a great while before a flush of pink ran along the row, for each of Hermosa's babies wore the distinctive pink gown. The master at seeing and the master at feeling discerned through his own unique knowledge which of these little pink princesses should remain with him to assist in the creation of the new rose and which must be sent over to the plant paradise. The school is filled with strong, healthy plants, as the result of his choosing of the best only, for plant improvement. They need less coaxing and petting than those of delicate constitutions and are always more attractive.

When the second generation of princesses were in full bloom, Bon Silene came into use, uniting its beautiful form with the fine qualities of Hermosa's healthy offsprings, by giving golden dust to apply to them.

After this many thousands of rose plants were seen growing in the nursery on the Gold Ridge grounds at one time. When these were all blooming, we think, must have been the time when Burbank heard them say this to the other children:

"See what we have to offer you, beautiful roses! Help yourselves; but we are frail bushes, so do not be too rough, else you may feel the stings of our armor, which we still have to wear." At least the master tells the children that rose bushes say this.

From the third generation of pink princesses crossed with Bon Silene came

two fine new roses, the Santa Rosa, which had been planned, and another that was christened "Burbank." The Santa Rosa is a wonderful rose in brilliancy of color, size and habit of growth. Each little one commences to bloom as soon as it starts from a cutting and grows freely and easily, blooming right along. Its flowers are a rich shell-pink, inclining to crimson, full and double. It is truly a rose for everybody.

The Burbank rose, like its creator, has great energy and enthusiasm. It begins to bloom when quite small and continues to bloom throughout the year, if the climate is not too severe. In cold climates it rests during the winter and comes forth at the first call of spring. It is double and of fine form. Its color is deep rose-pink, and it is so delightfully fragrant that it would do you good to bury your nose in its sweetness. The Burbank is the freest bloomer in the rose world; and it was awarded the gold medal at the Louis and Clark World's Fair in St. Louis, Missouri, in 1904. This was won over all competitors as being the best bedding rose in existence.

Burbank is exceedingly fond of the rose, and has sent other noted ones from the school to gladden rose-lovers. One of these, the Corona, is indeed a rare and charming flower. It is a climber, produced by scientific selection alone from seedlings of the Crimson Rambler. Its flowers resemble Chinese primroses more than they do real roses, and they grow in very large clusters. It is a fine bloomer and forms a bower of rare loveliness throughout the season. Its blossoms possess a quality entirely new in the rose, which causes the flowers to remain fresh on the bushes for weeks, where others fade and drop their petals in a few days.

## CHAPTER XXV.

### THE FIRESIDE FRUIT.

WHEN the apple decided to enter school, it did not tell the master that it is one of Nature's oldest fruit-children and that the lessons it had learned would be hard to forget or that the habits it had formed would be hard to break; but we are sure that he knew this for it was one of the first friends of his childhood.

On his father's New England farm the frosts of spring often blighted the early blooming plum, pear and peach; but the buds on the apple trees kept their cloaks folded tightly until Jack Frost's reign was succeeded by warm sunshine. Then the delicate pink and white blossoms threw off the cloak of brown and among the green foliage sang the robin, the wren and the thrush on their return from winter homes in the tropics.

As the blossoms faded away and the tiny apples formed, then reddened, and finally acquired stripes of carmine and of gold, the different varieties were closely watched and studied. It was he who discovered the first faint coloring of the Red June, and Williams. He became acquainted with the names of the many kinds, for one of his early treasures was a book with pictures of the different fruits in outline. Many of these may now be seen in the same old book shaded by irregular pencilings made by boyish fingers.

As some of the trees in the orchard bore inferior fruit, George, his older brother, decided to secure scions from the best varieties of apples of that time and graft the trees. Luther was then only five or six years of age but he became interested in his brother's work, he could not quite understand why the fine large limbs of his favorite trees should be cut off. His brother explained the process, however, and the little boy took delight in watching the grafts grow.

After the third summer, when the grafted limbs began to bear and the round juicy Baldwins ripened, while the ungrafted branches were filled with poor fruit young Luther decided that grafting was surely of much use.

The harvest time was a joyous season when the Williams, Gilliflower, Baldwin, Greening, and Russet were each, in its turn, gathered in great baskets and stored in bins and barrels for winter's use making the cellar rich with their fragrance.

For two weeks each fall the carpet of the large living room was removed, the ample fire place opened, and, on cranes were hung big brass kettles for boiling cider. Then, as the flames laughed and roared up the throat of the great chimney the family in quiet mirth, encircled the hearth, pared and quartered the apples for the winter's supply of cider apple sauce. The story of Johnny Appleseed, the eccentric character who planted seeds of fruit trees in the wilds of the Ohio Valley, 1801-1847, and those of other heroes of early times were often rehearsed. Many happy winter evenings were passed around the New England fireplace.

“The mug of cider simmered slow—  
The apples sputtered in a row  
And close at hand the basket stood  
With nuts from brown October's wood.”

Here, no doubt, was formed the love for the apple which helped to give to the future scientist patience and skill to add to the already long list still other and better varieties of apples.

One of the first apple pupils was his old time friend the Williams. The master of the school, wishing to develop the fruit, planted seeds from this apple and as apple seedlings vary greatly, never coming true, there was a great variety of young tree pupils to train. All those giving promise of better fruit were grafted upon a large strong tree. In the arms of this were rocked seventy-five varieties of apples. When they ripened, they were of many sizes, shapes and colors; red, green, yellow, striped, splashed and dotted. Some were inferior, others of especially fine quality.

They were exhibited at the Stanford University by Burbank, who was, at that time, a member of the faculty, and used them to illustrate a lecture. They were afterwards placed on exhibition at the San Francisco ferry building.

Burbank now chose one of the best of all apples, the Gravenstein, for special training. Thousands of seeds of this fruit were planted and thousands of young tree pupils were soon in training. Selecting the best from this vast number would seem an insurmountable task for most people, but Burbank has hundreds and sometimes thousands of such experiments under way at one time. Selections are made by him, but assistants do the planting, cultivating and grafting.

The Gravenstein pupils remained in the school for many years that the best might be found, then an apple was graduated which ripens later than the Graven-

stein and is called the Winterstein. The trees are strong and heavy bearers. The large juicy apples are yellow with stripes of rosy red.

Believing it possible that another good apple could be improved he chose the Newtown Pippin as a pupil. Many seeds were planted, and when promotions were made the best were selected from the thousands. After years of training another apple was graduated and given the name of the school, "Gold Ridge." This is a pale, yellow apple with a crimson blush on one side. It is large, smooth, of beautiful form and fine quality. It ripens earlier than its ancestor the Newtown Pippin. Thus one of Nature's oldest fruit children has been cherished, nurtured, and disciplined by the teacher and the present year, 1913, finds many hundreds of unnamed apple pupils in the plant school. The fruit on these young trees differs in size, color and quality. Most of these will be found wanting when the final testing time comes, but others, no doubt, will live for many a decade to send their rich fruit to happy firesides to grace the golden winter evenings passed by circles of joyous friends.



## CHAPTER XXVI.

### THE PLUMCOT.

STANDING at the head of the class of distinctively new fruits is a pupil of such renown that, "All the world wonders." It wonders not, in this instance, at the daring of a "noble six hundred," but at the daring of a searcher after Nature's secrets.

Men in high authority upon plant growth said, "No use to try," "It cannot be done." "A waste of time to experiment." "Such crosses never have been, and never can be successful. Members of so widely differing species cannot be united."

These and many other discouraging messages reached the ear of the master of the plant school. Still, "Right through the line he broke," as Tennyson said, though warnings "Volleyed and thundered" from scientific cannons all around this great earth.

Patiently and with unabating perseverance the master toiled on, not into the jaws of defeat on the field of battle, but to one of the greatest victories yet recorded in the field of horticulture. As a result of this perseverance Plumcot ranks first in the class of new products of the plant school, although many other new fruits and flowers have been given to the world.

Wishing, if possible, to develop an entirely new fruit, the master chose as his especial charge a plant pupil from Japan; for he has learned through years of experimentation that, in order to get results from cross pollination it is better, sometimes, that plants come from widely distant countries. The Japanese plum had also many good qualities to recommend it.

On a bright morning in spring when this stranger from Japan was decked with white blossoms the master came, bringing to many of these blossoms golden pollen from one of his apricot trees.

It was at this time that learned and wise men declared, "It cannot be done." Burbank said, "We will try."

You may be sure that all the fertilized blooms were watched and when the fruiting season arrived, seeds saved for planting. From the first the young trees from the cross varied greatly, some were more like the plum, others like the

apricot. The leaves were also changed, they were larger than those of the plum, and in shape somewhat like those of the apricot. The character of the tree was greatly changed.

It is now twenty years since Plumcot came into existence, and although a promising pupil from the first it has been under constant training. A great amount of care and expense have been bestowed upon it, yet never through all these years, has the master lost faith in his experiment.

During this time other crosses have been made; pollen from some of the best American plums having been successfully used upon the plumcot. A long series of scientific selection followed cross pollination. "Without selection," says Burbank, "pollination is of little use."

Tens of thousands of plumcots have been in school, and as a result of careful training four large classes have been graduated and a delicious new fruit has been added to the dietary of the world.

Many other varieties are still in training, some of which are even more promising than those already sent out. The future will no doubt witness as great and as worthy an array of plumcot graduates as the past has seen of plum graduates.

The first to leave the school was "Rutland." The tree resembles the weeping willow. Its long swinging branches, thickly set with bright green leaves form graceful arches over head. When the fruit is fully ripe, its deep purple velvety skin adds new beauty to the tree. The color of the flesh of the Rutland plumcot is a brilliant red. In size the fruit excels its near relative the plum.

"Apex" is a later and far superior graduate. In this the tree is somewhat like the plum but the fruit is almost as round as a ball. Its skin is a rosy pink, but the flesh is a bright yellow. Apex is a freestone, while Rutland's juicy meat clings as closely to the stone as does that of a cling stone peach.

A third to be graduated is the "Triumph." This tree resembles the Rutland, but the fruit is apricot like and has a purple skin, dotted with scarlet. The flesh is a deep crimson.

The fourth of the plumcot class to receive the diploma is the "Corona." This is as large as most apricots, is golden yellow with pink cheeks, and the flesh is yellow.

All have distinct and unique flavors—a combination of the plum and apricot, yet unlike either. Each new variety brings new flavors, and although those that have been sent out are delicious, those that are almost ready to leave the school surpass in size, flavor and abundance the first varieties.

Now that the success of the unusual experiment is fully assured let each boy and girl who reads these stories be more firmly convinced that,  
"They can conquer who believe they can."

## CHAPTER XXVII.

### THE FLOWERING CURRANT.

"I AM bitter ; please take me and make me sweet," pleaded a small voice, almost choked with dust, as Burbank drove by one lovely autumn day.

The little currant held out its small blue berries covered with dense bloom, as if to show him what it had tried to do for itself.

His eye ever alert, his ear ever at the heart of nature, and his sympathies never failing, he heard the call of this little country child. He saw its helpless condition, and understood its longing for different environment.

Springing out of his buggy, he came close up to it, saying, "Ah, ha ! so you would like to go to school and have me teach you with these other wildings I have here, would you ? Come along, then, and we'll see what we can do for you ; but remember, you must be obedient, and willing to help others, as well as to help yourself, if you wish to be made sweet."

He tenderly lifted her up, and little Hopeful soon found herself in the back of his buggy jogging along toward Santa Rosa. The woodfolk soon grew very sociable, for they were all together in one great gunny sack.

A brodieae said in rather an important way, "I'm going in for purity. I'm going to have my dress made white, for I heard him say so."

"I'm going to help train the eastern lilies," put in the spotted tiger lily.

"Well, all I want is to get rid of this puckery bitterness," ventured Hopeful, "for people turn away from me in disgust ; and I can never do any good in my present condition. I would try to grow more pulp but for that. What is the use ?"

"It seems strange you speak of being so bitter when you carry such a delightful fragrance with you," remarked the wild geranium, who was also known as *Heuchera*.

"Oh, that's just it. They call me the incense shrub, because of my spicy odor ; but, when they taste my fruit, they cast it away quickly with, 'Bah, but she's bitter !'"

The currant did not see the brodieae, the tiger lily, nor the *Heuchera*, for a long time after this ; for its department in the school was far removed from the

lily plot, and the one assigned *Heuchera*, as well. But she held them in loving remembrance, hoping to meet with them again some day.

The next morning after her arrival, as she was admiring the pupils near her, who seemed to be in her class, her eye fell upon one quite close, that was wonderfully like herself in many ways. Upon inquiry, she learned that it had been brought down from British Columbia, and was, no doubt, a blood relative of hers. This caused her heart to grow lighter—a feeling of contentment stole over her, and she began to enjoy her beautiful situation more and more.

When she put her mind upon her advancement, she learned many things about herself and her family that had never reached her in the great open, for gossip is not rife there as it is in thickly settled places.

An English visitor to the school, coming upon her one day, exclaimed to the teacher. "Why, you have here our flowering currant. We prize it highly in Europe as an ornamental shrub, on account of its bright, graceful blooms. What are you doing with it?"

"You probably know that it is a native of the Pacific coast," said Burbank. "I hope to persuade it to leave off its bad habits of bitterness and seedy little pulp, and train it to grow good, sweet luscious fruit for your tarts and jellies. It will then become useful to you, as well as ornamental."

Little Hopeful was listening, and you should have seen the long clusters of bright pink flowers with which she decked her clear, brilliant green foliage. They were the very incarnation of the spirit of spring, and they quickened one's senses into anticipation of beauty everywhere. And her numerous glands exuded such heavy perfume that everyone paused to admire her, and some one exclaimed, "How refreshing this dear little thing is in her native grace! Her simple ways are so charming."

Now, there were in the primary near at hand a number of little pupils grown from the seeds of the currant from British Columbia, some of which showed great promise. Their foliage was fine, and their deep pink—almost scarlet—blooms were very attractive. Many of the flowers were larger and there were a greater number of blossoms in a cluster than their parent had produced.

The teacher came one morning with some yellow dust, which was given him by one of these little Britishers, and placed it upon Hopeful's bright bloom, telling her to nourish it, and to make a great big effort to throw off her bitterness, and to become juicy and sweet.

She heard a whisper as the pollen touched her stigma. It said, "Wake up,

and grow." Then she realized that she was learning her lesson. She had never had anyone to take an interest in her before, and no one had seemed to care whether she advanced or not.

The next season little pupils of her own were blooming all around her; and, as she compared them with the others she had seen, it appeared to her that many of them were in every way superior. She was sure she was right when she saw the master-prover placing tags upon some of them. And again, when he came at fruiting time, he selected those that had long clusters of fat, ripe fruit. By the way he looked when he tasted them, she knew her longing was to be satisfied.

Another year passed, and the seeds from the chosen ones were planted in large numbers. Selections were in time made from these, and a few proved worthy to be promoted for higher culture in flavor and lusciousness.

A new kind of currant is soon to go out from the plant school. It promises to have a finer aroma than any yet known of its kind, and it is quite hardy. Burbank is extremely careful never to present to the world any production unless it is equal in all points, and superior in some way to anything of the kind ever before produced. So when he shall present this new currant—Hopeful, in her graduation gown—she will make quite a stir in the currant world, you may be sure, for she has learned well her lesson of obedience, and made good in the plant school.

## CHAPTER XXVIII.

### THE ATHLETES.

ONE might think it impossible for the student body of a plant school to engage in athletics, but really, it is quite as feasible as for our boys and girls of the grammar and high schools to enjoy the low hurdle or the running high jump.

The athletes in the Burbank plant school seem to be among the tree pupils. Of these the walnut takes the lead. To most horticulturists it would seem impossible to improve the slow growing black walnut tree, in fact, so far as is known, Burbank is the first man to try to break the life habits of this tree. Fear of failure does not daunt him, nothing in the plant world is too difficult for him to attempt. Where Nature is the slowest and where her plant children are the most deficient he is especially anxious to enter.

Walnut pupils were brought into the school about the year 1886. The first two to enter were the native California black walnut and the English walnut. Pollen was taken from the English walnut and placed on the stigma of the black walnut and when the nuts ripened they were planted. The young trees were allowed to grow until they were large enough to be grafted onto the arms of a strong, large walnut tree. When these grafts bore fruit other trees were raised. The process continued until as many as ten thousand walnut pupils were found in the school at one time. Athletes were to be selected from among ten thousand.

Among these ten thousand pupils many strangely clad were seen. The leaves of some were small and had from three to seven leaflets on either side of the stem, others were large with nine, eleven and fifteen leaflets. Some were rough, others glossy, others smooth. Many of the young trees resembled the black walnut, many the English, while some were unlike either parent tree. Some of the trees grew slowly, others were hustlers. One of the fastest growers carried a perfume, for the leaf when crushed gave a delightful fragrance resembling that of an apple and as lasting as the odor of the violet.

The variation in nuts, that these trees bore, was almost as great as that of the leaf. There were large nuts and small nuts; nuts with thick shell and bitter kernel and some with thin shell and sweet kernel. Some trees were heavy bearers, others bore very little fruit, and some, none.

But as the master was training this especial class in rapidity of growth, the best young racers were placed in long rows in the school. We feel sure they were as strictly attentive to the orders of the coach, as if they were intending to train for the Olympic games. No strong drink nor tobacco were indulged in and as for keeping late hours, why, they were ready to sing good night with the sunset breezes and to awaken in the morning at the first call of birds in the tree tops.

As the training progressed there were many try-outs, and, as the coach selected the fastest growers for further team work, no doubt great rounds of "rah, rah, rah," were sent up by the admiring plant pupils for the victors.

After years of patient labor the coach chose from among his Paradox pupils a team of six young athletes. These he placed in the hard earth along the street in front of his dwelling. They must now do their best without further training and receive no nourishment other than that gathered through their own efforts.

Across the street opposite the athletes stood another row of trees. These were the English walnut. They had more than fifteen years the start of the Paradox, and were in highly cultivated soil, but the athletes had been in training, you know, so they must have felt quite sure of winning.

In a plant school a race extends through a period of years instead of a few seconds as in a school for boys and girls.

How those young Paradox racers ran! The slogan for the race was, "Smash the record," and they seemed determined to smash it. At the end of the third year, such enormously long arms had been sent out and such thickness of body was displayed that they began to create quite an excitement in the community. Even the passerby observed the swiftness. No doubt the other plant pupils gazed with admiration across the fence at their team and as the wind whistled through their branches sang,

We will love you, "Doxies," if you beat them,  
 We'll stand by you, "Doxies," if you don't,  
 You surely are the cream,  
 You're the picked, the winning team,  
 You're our own "Doxies"!

Those Paradox racers took courage, surely, as the student yells were sung by the breezes and echoed and re-echoed from "Doxie" to "Doxie."

The excitement and general interest became intense as farmers, laborers, and merchants, came and went along the street between the two rows of trees.



Burbank's walnut pupils on one side of the street increased at an incredible rate often being encouraged by the class yell,

“Rah! rah! rah!  
Who are we?  
We are the “Doxies,”  
The winning tree.

The sturdy English opponents across the street continued the same slow pace that had been theirs for ages. For fourteen years the race continued then the timekeepers called the finish. It was evident that the trained athletes had won the race for the announcement was published far and wide that the Paradox had grown in fourteen years almost six times as much as the English had in thirty years and at the height of six feet from the ground some of the winning trees were six feet in circumference, while their branch spread was seventy-five feet.

Of course there was great rejoicing in the school. Why not? The race was fairly won, besides the “Doxies” had shown more “class” than their opponents.

The judges, however were tradesmen of different kinds. They came forward with grave and knowing faces. The lumberman declared:

“The grain of all rapid growing trees is very soft, therefore, the wood is unfit for interior finishing and cabinet work; for strength and durability the wood from trees of slow growth is unequalled.”

The coach, being wise, and ready for such criticism, had prepared a limb of one of the Paradox athletes for inspection. As the lumberman continued his sarcastic speech, a block from the Paradox was handed him. He immediately took his knife from his pocket and tested the wood for hardness. His fingers passed rapidly over the smooth sawed surface. His grave countenance quickly took on a look of vexation, as he reluctantly acknowledged that the Paradox not only equaled, but excelled the older varieties of walnut wood in hardness and beauty.

At the beginning of the lumberman's remarks the uncultivated plum pupils, surely looked very sour and as he continued his harangue there was a fearful bz-z-z-z among the pines; but when at last he was forced to admit his defeat who can blame the rooters for the cry,

Give 'em the axe, axe, axe,  
Give 'em the axe, axe, axe,  
Give 'em the axe,  
Give 'em the axe,  
Give 'em the axe,  
Where?

Right in the bark, bark, bark,  
 Right in the bark, bark, bark,  
 Right in the bark,  
 Right in the bark,  
 Right in the bark,  
 There!

Quiet again being restored the cabinet maker and the polisher took the stand. The cabinet maker examined the wood and with his pocket rule laid across the surface of the block exclaimed,—

“Why! the annual growth is fully an inch—an excellent lumber for furniture, veneers, and ornamental wood work.”

Then the polisher applied his test and announced the wood unexcelled for smoothness and fitness for polish.

Now came a fearful rebuff from the friends of the English.

“The Paradox have not won all the points,” said they, “see what a quantity of rich nuts these beautiful trees bear while the Paradox bears very few.”

The judges shook their wise heads and said, “Who ever heard of racers bearing heavy loads?”

At this the bleachers almost went wild—

Zip! Boom! Bah!

Rah! Rah! Rah!

Ninety million, eighty thousand, seven, sixty-seven

That's what they think they bear,

They bear but ten or 'leven.

The judges were united in this general conclusion,—

“As the Paradox will grow faster than any other tree of the Temperate Zone it will no doubt prove a blessing to mankind in reforesting the earth.”

My! what a noise when this was announced.

## CHAPTER XXIX.

### CHERRIES.

ONE often wonders how the teacher of the plant school was able to make such a wonderful change in the cherry. The plump Royal Ann, as she is now, with her blushing pink cheek is admired by every lover of nature, as she gracefully hangs from her slender stem, or peeps from beneath her canopy of green leaves. During the months of May and June she seems perfect. When one visits an orchard of these trees and is permitted to taste the fruit further improvement seems hardly possible.

The Black Tartarian, also when fully ripe, is delicious. It is so sweet and juicy when first taken from the tree, one wonders how it could be made better, but the master, in his vision sees cherries far superior to any yet produced.

The first cherry pupil was the purple Guigne, noted for its earliness. The teacher wished it to become still larger, earlier, sweeter, and more productive. Even a day's difference in ripening of the cherry crop means much to the California producer for the first fruits of the season are shipped east and bring high prices.

So the work was begun. Thousands of pits were saved from the Guigne and soon the kindergarten was full of young cherry pupils. All the best were later promoted to Gold Ridge. They were grafted onto large strong trees, many hundreds being put on each tree. From the best of these, seeds were saved and other trees grown. The process of selection in this case was a long one and continued for many years before the first cherry pupil was graduated. This tree was sold, and the proud purchasers named it "The Burbank Cherry" in honor of the master.

The new tree is vigorous, and never fails to produce large quantities of luscious fruit. The leaves are large and grow so close together that the plump black cherries are well protected from the birds. When it rains, this heavy foliage serves also as an umbrella to the fruit and keeps it from cracking.

The Royal Ann, before mentioned as being so nearly perfect, was early admitted to the school. This distinguished pupil is of French origin. It has been

a favorite for a hundred years or more. Its correct name is "Napoleon," although in the west it is commonly called Royal Ann.

The Napoleon has a few faults. When its rosy cheeks are washed by a May shower its skin cracks, this spoils its beauty and usefulness. Sometimes the tree fails to bear, at other times the crop is very light, but by many people these faults are overlooked and it is still called the Royal cherry.

As usual when Burbank began to train the Napoleon many, many thousands of pits were planted and for years the class received constant care, and selection of the best was made from year to year until finally a descendent of this time-honored cherry was graduated.

The graduate is far rosier than its noted great grand parent, its skin is much darker, its flesh is sweeter, a shower does not harm it, and it has never been known to fail to produce a good crop. This cherry has been given the very appropriate name, "Abundance."

The "Giant" is another member of the cherry class. Its training, too, has been long and severe. Its distant relative is the Black Tartarian, but its education has fitted it for greater usefulness than the Tartarian. It has to date of this writing—1913—proven to be the best cherry in existence. The tree excels the Tartarian in productiveness. The fruit is of superior size, quality and flavor. Eleven of these new cherries lying side by side measure twelve and one-half inches. Four or five weigh an ounce. The skin is black and glossy, the flesh is dark and luscious, the tree is strong, upright and a rapid grower.

One might think that the master should be content having so many cherry graduates, but he is not. Very little scientific work had ever before been done to improve the cherry. That it can be developed almost beyond imagination is shown by the results of work already accomplished. There are at present near one thousand varieties of cherries in the Gold Ridge school. There is one tree with over two hundred different varieties grafted upon it. In the bearing season some will be ripe while others are yet forming and there are all gradations between these extremes. It is an interesting study to observe the variation of foliage and fruit. Some cherries are small but exceedingly sweet, and some are very sour. Some have the flavor of grapes, others taste like the apple, and many are far better than the older kinds. There are also peculiar shapes, one is long and pointed, another oblate, like an apple, some look like small plums.

Two of the new cherries are still earlier than the "Burbank" heretofore mentioned, but many ripen very late. Some are exceedingly productive and

give promise of being the best of shipping and canning cherries. There are cherries in training that have never failed to bear fruit and have never been known to crack even after a hard rain.

It is well known that the acid, which gives the cherry its sour taste, is very wholesome, especially for children; but if one drinks milk with cherries, the acid causes a hard tough cheese to form in the stomach. This cheese will not digest and sometimes causes death. Rich cream is not affected by the acid, so cherries and pure cream may be eaten together.

The instructor in the plant school says: "Tell the children we are going to get them some better and sweeter and larger cherries than any they have ever yet seen, but this will take a long time and a great deal of work, still we will keep trying until we succeed."

Just think of the time when we shall have cherries as large as big plums; so large that we shall cut them in two to can them as we do peaches. And then we shall also have many different kinds, some will ripen early and others very late, and some will grow and bear in a cold climate.

## CHAPTER XXX.

### THE EARLIEST GRAPE.

THE great vines of wild grapes clinging with their delicate tendrils to the tall trees and swaying in the wind, were no doubt enjoyed by the little Indian boys and girls of North America hundreds of years ago with the same enthusiasm that the white children today feel when in vacation time they camp by the river's bank and swing on the vines.

The beauty of the grape has been sung all down the ages. Even Greek mythology is enriched by stories of the vine. Through cultivation the fruit was improved and developed by the ancients until it early became renowned in the far East.

One would think that the grape, being so old, would not need further training but plant pupils of all kinds are admitted to the school.

As a child Luther Burbank learned to love the grape, as he did many other plants, not for the luscious fruit alone, but for the grace of vine, delicacy of tendril, and beauty of leaf.

Clinging close to the south wall of his father's house in Massachusetts was a vine of Isabella grapes. From the time it was planted Luther watched it and studied its growth. He learned that the buds appeared in early spring, then the leaves, after them the blossoms and finally if sly Jack Frost found the sunny south side of the house too warm for his icy fingers large bunches of purple grapes were gathered and some were carefully placed in a cool, dry room where they remained as fresh as the apples of the orchard into the early winter months.

When Burbank came to California this friend of his childhood was not forgotten. He studied grapes grown on the coast but found few among them which had come from New England. Many varieties from Europe and Asia were raised and the Missions brought to the state by the early Mission fathers were found on almost every homestead. The grape industry flourished throughout the beautiful valley wherein the scientist chose his home.

In the plant school seeds were planted from the Black Hamburg, Muscat of Alexandria, Rose of Peru, Tokay, Mission and the Eastern grapes, the Con-

cord, Catawba, Isabella, Early Amber and Niagara, and numerous wild varieties from South America and China; but none worthy of graduation were produced although thousands were raised.

Peculiar and as yet unexplained conditions often occur in plant growth. In Santa Clara Valley among an acreage of Isabella grapes one vine was found on which was a branch of extraordinary size and great rapidity of growth. This branch bore leaves unusual in size, and grapes much larger than those on the surrounding branches or vines. The berry was also superior in quality to the others.

This new grape which nature caused to spring from the Isabella vine was very properly named "Pierce," from the man on whose farm the grape originated. Burbank procured some cuttings from the Pierce and raised the fruit for the purpose of getting seeds of this new bud variation. Among the very numerous seedlings all had some faint resemblance to the Isabella in both vine and fruit but there were peculiar traits among them also.

On some of the vines the bunches were long and slender, on others they were short and thick. The berries varied in size, color, flavor, and time of ripening. Some were large and luscious, others were small, sour, and seedy. The colors were white, light cream, amber and rich royal purple.

There was as great a variety of leaves as of fruit; on some vines the leaves were small and shaped like an English ivy leaf, on others, unusually large and of many different forms.

Among these many peculiar seedlings about a half dozen bore yellowish white fruit. One kind has a delightful aroma, and a flavor not found in any other grape, more like the European varieties than the Isabella, but much finer in quality. Another, an extremely late and unusually large grape, is very delicious and in the mild climate of California it will keep on the vines until Christmas and New Year if protected from heavy rains.

Thus we see how strangely plants vary when taken under training and grown from seed. From this experiment by selection alone, one of the earliest grapes ever known was produced, and also one of the latest.

"This is not a wine grape," said Luther Burbank when asked if any of the new varieties excelled as a wine product. Then looking at the questioner with eyes full of thoughtful emotion as if penetrating far into the future he added:

"The continued use of wine destroys the finer qualities of both body

and mind. Tell the children I have never produced a superior wine grape and that if I ever do produce one it shall be at once destroyed. No wine grape will ever be sent into the world from my experimental grounds."



## CHAPTER XXXI.

### USEFUL, AND BEAUTIFUL.

Two little pupils from Japan once came to the plant school. Very distinguished they were, for they were sent from the garden of the Mikado. They were already of considerable worth else they would not have had so distinguished a home in the far East. Indeed, they were greatly admired by children of Japan, for every year during blossom festivals they gave delight to many kimona-clad maidens who reveled in showers of white and of rose-colored petals from their blossoms. For one of these fruit pupils had chosen white as its spring decoration while the other, each season, was bedecked with brilliant red.

We are sure that they were not lonely in their new home, they had so many friends and neighbors; many of these were from their native land, but many more were from other parts of the world. There was the edible ash being trained to discard its bitter puckery character and become more useful.

Corns from South America, Mexico and Japan formed a very large class, and attracted the attention of all visitors. One with long, ribbon-like blades striped with rainbow colors added grace and beauty to the garden. The master was training this to grow larger and to keep its colored stripes of uniform width.

A queer experiment with Indian corn was witnessed by the Japanese pupils. It is called Indian corn, but even before the Indians inhabited North America the corn had begun its upward march toward perfection. It did not always have the full compact ears of plump kernels we now see, centuries had passed in its development. The master decided to have it retrace its steps, to go backward to what it was before the Indians came, thinking that he might gain some knowledge by which he could train it for greater usefulness. The backward steps were taken in a few years, so, in the plant school, corn in all stages of development may be seen, from wild, grass-like corns to the best cultivated kinds.

And the plant pupils heard the story of little Prince Artichoke who, robed in purple and green, came to the plant school direct from the gardens of the King of Italy. When he reached America he found that here his most numerous relatives were the despised and neglected thistles growing by the wayside and in the fence corners, although in southern Europe the artichoke grew in abundance in

the gardens of both rich and poor and was highly prized as an article of food. It was served not as a vegetable alone, but in salads, soups and many other ways; and the hearts of the tiny buds preserved in oils, called baby artichokes, are thought a great delicacy.

But in America the real artichoke was little known or appreciated, so the mission of this little foreigner was to make his kind an important article of diet. This he had largely accomplished before the Japanese pupils arrived, for from the plant school had already been graduated an artichoke of very superior size and quality and with great deep sky-blue blossoms very ornamental.

They saw curious odd-shaped fruits of different colors, produced by grafting a potato vine onto a tomato vine. They learned that it was only one of very many of the master's experiments, one easily effected, as the potato and tomato are nearly related plants, but the aerial potatoes which grew on the vine were of no especial value.

They saw also experiments with grasses, grains, wild flowers, weeds of various kinds, peas, beans, egg plants, carrots and so many more that the little strangers felt no longer strange.

One experiment which to them seemed very sad in its results was that with a very delicate border plant. It came to school to be made larger, stronger and more nearly perfect. It was called "mesembryanthemum." It had been in training for four years and had learned to produce a profusion of white flowers, its foliage was larger and it seemed stronger. The master had these plants in various parts of the garden and in the conservatory; but from some unknown cause each plant died suddenly. Thus this new flower was lost to the world and the work of the teacher unrewarded.

Yet the Japanese pupils were not discouraged, they had been sent to be trained for further usefulness and when they saw the improved peach pupils with their large, luscious fruit they surely had faith in the teacher. But the master knew he had a difficult task for the ancestors of these foreign trees had never produced peaches of value. For hundreds of years they had been grown in their native land for the beauty of blossom and foliage. The fruit they bore had a rough pit, and was small, tasteless or bitter.

It was many years before the master succeeded in training the Japanese trees to bear, but at last it was accomplished by pollination and selection. All Japanese peaches are subject to a disease called curl leaf. These flowering peaches were crossed with the productive sweet Muir which is not greatly troubled with the

disease. After a long series of selections a tree was raised which grows six times as fast as the flowering peach and when spring comes it is wreathed in extremely large double blossoms of brilliant rose pink. These blossoms are nearly three inches across. When the tree is in full bloom it looks like a bower of roses, and when the fruit ripens it is of a superior quality, as large as the Muir and an excellent canning peach.

Thus as this stranger from the Mikado's garden has grown more useful it also has become more beautiful and another new fruit has been added to the long list of graduates from the plant school.

## CHAPTER XXXII.

### JUMBO.

ONE time Burbank brought home to the plant school a tiny, cunning Japanese dog, which he named Jumbo. The little dog cost almost his weight in silver; but never during the thirteen years of Jumbo's happy life would the master have parted with him for his weight in gold.

Jumbo, like his namesake, the big elephant, was very wise, and when his master said, "Be careful never to step on the flowers or dig them up," his beautiful large eyes shone with intelligence. He understood every word, and was not known to disobey. He learned to love the same things his master loved, and walks with him in the garden were his delight, although he chose other places for his frolics. He really seemed to know and admire the plants. He knew always when a plant was removed, and another took its place. He appeared, too, to know by instinct just where the master was going, running on ahead, and waiting at the particular plant or tree upon which the great gardener's attention was at the time directed.

The greatest joy of Jumbo's life was, however, the day that Burbank spent twice each week at the Gold Ridge farm. The evening before, the master would say, "Jumbo, you must get up early tomorrow morning, and eat a good breakfast—we are going to Sebastopol."

Now Jumbo was an aristocratic dog, and usually stayed in his warm bed until breakfast was announced, but on these mornings he was up early, and so eager was he to be off that he very impatiently waited for the family to breakfast first; and when given his own was almost too impatient to eat. When his master would say, "Yes, Jumbo, eat a good breakfast, so you can go with me," his efforts to eat quietly were really amusing.

Then in his own language Jumbo would ask to have his coat strapped about him, for the little body was very sensitive to the cold of the early morning. With barks of joy he ran to the gate, and was placed in the wagon on the seat beside his master. How proud he felt, barking at the big dogs they met on the road, no doubt thinking that he was the biggest of all!

Arriving at the farm, he followed his master in the warm sunshine all the

morning hours up and down the long rows of beautiful flowers. He lingered in the shade of the trees, becoming acquainted, and making friends with every growing plant, and all the time ants, bugs and toads were also receiving their share of attention from him. It was hard work following the master; so, after lunch he was usually contented to take a nap, lying quietly beside his master's coat until he saw Black Belle harnessed, and a tired, but happy dog, knew it was time to return to Santa Rosa.

Jumbo's bed was a small box with an opening in one side, as well as at the top. When it was bedtime he would jump into the box and wait for his master's "good-night," keeping very quiet, and listening to

"Now I lay me down to sleep,  
Hope my master will always keep  
A hunk of bread and a chunk of meat."

Then, kissing his hand, Jumbo would curl down and have his blanket placed over him. He did not crawl out from under the cover until morning, but sometimes a little brown nose might be seen at the opening in the side of the box.

One day soon after he came to the Burbank home Jumbo stood watching Tortoise, the cat—an older, and larger member of the household—eating from a small dish. Evidently he had noticed that Tortoise had always the same dish, and that he was not allowed to eat from it. Probably he did not understand that his tongue lapped up the milk so fast that the cat, with her daintier way of eating, would have had little chance to get her breakfast had he been allowed to eat from the same plate.

Jumbo stood still for some time, an act which was quite unusual for such a lively little animal, as if trying to solve a hard problem. Suddenly he ran out into the field where some soil was being prepared for use in planting. Among the ashes brought from town were some broken and discarded dishes. Jumbo carefully dug the ashes over, and from the rubbish selected a small plate. With his delicate little paws he pushed it aside, and after much hard work succeeded in bringing it in his mouth to the house.

Placing it beside the cat's dish, he looked around with a satisfied expression, as if to say, "I, too, now have a dish of my own." That was ever after Jumbo's own personal dinner plate, and he did not allow the cat to even look at it.

Jumbo was a very fastidious little fellow. Once an ant ventured to climb up over the edge of his plate toward the food. Jumbo stepped back, gave two or

three sharp barks; then, with a look of disgust, walked away, leaving his dinner untouched.

When Burbank came in at night, tired from a long day's work preparing the soil or caring for the plants, he would say, "Now, Jumbo, you must make me laugh." Then the dog would stand perfectly still, drop his long soft ears, shut his eyes, and would not move until he thought of something to do. Suddenly he would become a clown, always with a new trick. Sometimes in walking across the room he would in the most awkward manner stub his nose on the carpet and tumble down, looking so surprised that no one could doubt that he understood the joke. At another time his repeated and unsuccessful attempts to jump upon a chair or the lounge ( a very easy task for him) would win the applause he anticipated. Again, he would take fright at a fly, or some imaginary object, pretending it was a great monster striking terror to his very being, then suddenly look around as if to say, "Did I fool you?" He never failed to produce the laugh, and receive the applause of his audience, whether it consisted of his master alone, or of other friends.

Because no member of the household ever deceived him, Jumbo believed just what was told him. He made friends readily, and was quite fond of his master's bookkeeper who highly prized the little dog's friendship. Unfortunately, one morning the book-keeper thought to play a joke on Jumbo. He told him to watch at the window for an absent member of the family, saying that she would return that day. Poor little Jumbo believed him, and watched patiently all day at the window. When the shades were drawn in the evening he actually cried, feeling no doubt that he was the victim of an unkind joke. Never afterward would Jumbo pay the least attention to the bookkeeper, except to look reproachfully at him, as if to say, "You are no longer my friend."

The one great sorrow came into Jumbo's life when Burbank decided to visit his friends and old home in Massachusetts. Jumbo seemed to understand all the preparations made for the journey, closely following his master's steps for several days before his departure, in every way showing unusual affection for him. Burbank patiently endeavored to make him understand that he would return in a few weeks, and that the best of care would be given to his little pet while he was away. Jumbo could not be reconciled, and after his master left refused to eat. Everything possible was done to comfort him. Something of his master's—a coat, a glove, a shoe, or hat—was given him each day, beside which he would lie and moan.

Very touching were the efforts he made to swallow a few bits of food, when told he must eat; but day after day he became thinner, until a letter was sent to Massachusetts, telling the master to return at once, or the little dog would not live.

And when Burbank came Jumbo almost died of joy. Although he had been told of the coming, the shock was almost more than the little wasted frame could bear; but he was carefully nursed, and in a short time he was again the happy little Jumbo, with his usual good, dog appetite.

After awhile Jumbo's days were numbered, and he closed his eyes. Very tenderly was the little body wrapped in his blanket, and placed in the earth in the shade of a beautiful palm tree near the master's home.

## CHAPTER XXXIII.

### OPUNTIA, THE CACTUS CHILD.

THERE was a smile on the fruit and a smile on the flowers; and a suppressed titter ran through the chestnuts, when Opuntia, the cactus child, came into school. He was so very green and such a homely fellow to look upon, that it must have been hard for them to keep their faces straight. But most of the plant children had long since caught the spirit of the school and learned to know that appearances do not count for everything and that nothing is entirely useless.

So instead of passing this odd little urchin coldly by, they made up to him and showed a willingness to have him one of them in all things. Plants, you must know, are sociable in their dispositions, and are often more or less dependent one upon another. They are seldom pugnacious, and most of them live peacefully together; for it is their nature to be cheerful and happy. That is why they add so much to our happiness.

Of course the school plants were curious to know where Opuntia came from, and something of his family history; for plant children are much like other children in this respect. To know them you must know something of their ancestors. Then, too, the school plants were anxious to know about the training he was going to take to fit him for his life work. This was natural for inquiring minds. They were all there for improvement, to be helped and to help others. No place in the plant school for the lazy!

Opuntia was very clumsy and awkward among so many graceful children, and feared lest he should injure someone with the sharp thorns he was compelled to wear in his old home as an armor of defense. So he drew back a little, and this made him appear timid. He felt the gaze of all eyes upon him, and that made him nervous, as it would you, or in fact any of us real people.

“Oh,” he thought, “if they would not look at me so, I should feel lots better.”

But so many disagreeable things had come to him in his lean little life upon the desert, that he soon recovered from his embarrassment and forgot himself in the maze of beauty about him. What a contrast to the poor dwarfed, hungry



ones with whom he had always associated, were these well fed, beautifully clothed plant children!

When Opuntia became better acquainted, however, he felt more at ease, and soon he talked freely with his new companions, and finally told them his story, as his old grandfather had often told it to him and his little prickly companions.

"I have many relatives in America," he began, "and several in other lands whom I have never seen. Some call us 'prickly pear,' because of our needles and our pear-like fruit; but our real name is Opuntia. Our blooms are either red, yellow or purple, and, unlike our bodies, they are very frail and beautiful.

"We had leaves once, as well as you," he informed them, "and were as thornless as Goldridge apple over there."

"Impossible!" came from the plant people on every side.

"Oh, no. I am quite sure it is true, for grandfather told me. When I tell you how it came about that we lost them, you can see for yourselves I am right.

"See these little leaflets I wear still, where the old true leaves used to be."

The cactus child was greatly strengthened by the nourishing food given him in such liberal quantities, and his spirit was rising.

"Long, long ago," he went on, "our people were stranded in a place where they had to hustle alone. They tried to help each other, but it seemed no use, and they became helpless and hopeless. The less hardy ones perished. The water gradually dried up as fine sand drifted in and filled the low meadow that was once our beautiful home, and which in ages past had been an inland sea. Then our people talked the matter over, and it was the opinion of the wisest ones, that, in order to keep any moisture at all in their bodies they must have smaller leaves or drop their leaves entirely. In this way there would be less surface for the hot sun and scorching winds to draw it out. They had to learn this, of course, from Mother Nature. And, do you know, I heard the master say the other day, 'Nature never lies.'

"As the years went by my people's home became dryer and dryer, gradually the water disappeared; and finally it was a desert. Then a still greater struggle began. Leaf, after leaf, was dropped, until all were gone and thick stems alone remained. The sun grew hotter and hotter. It became more and more difficult to get food from the dry plain, and the thirsty and hungry animals tormented them constantly.

"Finally a great convention was called to discuss the sad condition; for no one had come to rescue them or to offer help of any kind. It was decided then and there to grow thorns with which to protect themselves; for without some means of defense, even after shedding their leaves, they would be driven from off the earth. Mother Nature, the friend of every living thing in the world, had already told them that this was their only hope, now that they were so hard pressed, and they believed her.

"They grew sharp needle-like thorns at first and placed them at just the right angles to ward off meddlesome tongues and teeth. They also placed bundles of very tiny needles, more than ten thousand to each stem, below and at the surface, where they were partially embedded in the flesh. These were even more dangerous to animals than were the larger needles; for they not only produced great pain and inflammation, but often caused death to the ones driven by starvation to eat the stems for food.

"Wearing thorns had a tendency to change the dispositions of my forefathers. They took on a fighting spirit, and much of their former sweetness left them."

Opuntia's tone grew serious, as he added, "Oh, if I could only be as beautiful and useful as my people once were!"

"No plant child can long remain here without becoming both beautiful and useful," spoke the once bitter elderberry, that had been a long time in training, but was now white and delicious as a grape.

"We know that," came from a passion flower over the way, as she waved her arms and nodded her starry crown. "We know that, see the fine fruit we will soon offer the world."

The master came on his regular round to note what the dear plant children had achieved, and they all turned to smile upon him, leaving the cactus child alone and thoughtful.

## CHAPTER XXXIV.

### OPUNTIA'S TRAINING.

THE master of the plant school, with the farsightedness of a prophet, saw what a great work could be done to reclaim the desert regions of the earth, if he could but rid *Opuntia* of thorns and prickles. The vast parched plains, now barren and useless, would yield a new food for both man and beast; for the cactus is nearly all food and drink. Burbank's quick eye saw beneath the rough exterior, behind the thorns, a tender heart, and not only a tender one but a juicy one as well. And, although *Opuntia*, the cactus child, stood there before him with his needles thrust out defiantly in every direction, seeming to say, "Touch me, if you dare!" the master knew that this unfriendly child possessed many good qualities, which recommended him for training in the plant school.

*Opuntia* had a strong, hardy constitution and grew rapidly. He did not shrink from the blistering sun, like most plant children. He could thrive on any soil, for he was used to small rations, and he did not care in the least if his home were changed from the barren plain where he was so hunted; for animals, both small and large, sought him there eagerly, though the thorns often pierced them severely.

*Opuntia*, thought the wise one, will doubtless prove a stubborn child and need strict discipline. It will require a steady hand to guide him; and great patience will need to be exercised for years and years. But no matter about that. No matter how wild or defiant a plant seemed, if Burbank saw in it something good and useful, the pupil was received even joyously, as in this case, into the school.

Luther Burbank had long been acquainted with many species and varieties of the cactus. Indeed, as a little child, when he first began to toddle, a lobster cactus in a little pot, one of the beautiful *Epiphyllums*, was his plaything. He hugged the treasure close and carried it carefully; but one day he stumbled and fell, breaking both pot and plant. You can well imagine how sorry he felt. Who can say but that this first love of the plant was the beginning of the great work with *Opuntias* he was to do for the world—the child-love for that little cactus plant.

The great work of training the cactus child began in earnest when the master brought *Opuntia* from Mexico. This was soon after he gave up growing trees in his nursery and turned his whole attention to plant improvement and the creation of new and better forms of plant life.

First the cactus thorns must be gotten rid of; for no other advancement would fit *Opuntia* for usefulness as long as he wore them. So the master gave the cactus child to understand that he would look much better and become more useful and lovable, if he would drop those ugly thorns and put on a civilized suit of clothes, and furthermore that he would save himself the great effort which he had to make to produce those thorns. He taught *Opuntia* that obedience would bring him into a beautiful life, and promised all the help and care needed. He assured the plant child that nothing should harm him, and that good nourishing food would be his in abundance. Plants, as well as human beings, know when we are kind to them, and little *Opuntia* felt all this kindhearted attention of the teacher.

Soon many of *Opuntia's* relations were brought in to aid in the great plan of improvement for the cactus child. *Opuntia* was greatly pleased, but when they tried to become acquainted, he was somewhat confused, for there was jabbering in so many languages. Some had come from Africa, some from Hawaii, others from Japan, Australia and the south sea islands, while there were those from France, Sicily, Italy and from many parts of the United States. Thousands were in one plot in rows only a few inches apart.

One thing that especially caused *Opuntia* to wonder was that he had fewer thorns than they; and he could not understand, as yet, how they could assist him in improvement. But later on he learned that each one possessed some good quality that was needed in his development for usefulness. One was more hardy than he, one produced more and better fruit, another had less of the tough fiber and more flesh, and so on.

A few of them had already been quite useful. A neighbor of his from Mexico he found served as a home for the cochineal bug, which, when dried, makes a famous carmine dye. One from Italy produced a fruit known as the Indian fig, which was relished by many as a food. Others were used in Australia, Mexico and in the southern part of the United States as a food for cattle, after singeing off the thorns.

When this great company of cactus people blossomed, the work of pollination or crossing began. This must be done in order to combine the good qualities,

to break up old habits and to produce variation. It was then that little *Opuntia*, the cactus child from Mexico, who was now growing thriftily, came into fullest notice for he was to have especial aid in his advancement.

While the work of pollination was a labor of love to the master, it was also an extremely painful task to perform. The cactus differs greatly from other plants in the facilities it offers for improvement. Its flowers are in full bloom, only from one-half to two and one-half hours in the hottest time of the day, during the hottest summer months. All arrangements for pollination must be ready when the blossoms first opened and waved their bright banners and exhaled their perfume to attract the bee or some other pollen-bearer; for no trace of pollen carried otherwise than by the master must be on the flower before the pollen he selected and applied to it. The work, therefore, demanded careful preparation and haste.

In gathering the golden dust from *Opuntia's* blossoms and in placing it upon the stigmas of the other cactus people's flowers, the teacher's fingers were often pierced by the sharp needles, and the tiny spicules sometimes worked their way into the flesh causing great pain. Every step in combining the thousands of plants must be carefully guarded. Only skilled workmen could aid in this, so the master endured the ordeal year after year, during all the time he was training his cactus child.

Most of the baby cacti grown from the seeds thus fertilized showed great stubbornness in their old habit of growing thorns and spicules. Thousands showed no improvement. Some were even more defiant, bearing uglier thorns and more of them. A small number showed a great change, by producing fewer spines or needles. These were placed by themselves. They alone had obeyed the master's instructions and would be allowed to go on to still higher advancement.

Selection, the greatest force in plant improvement, is always a slow process. It requires skill and delicacy of recognition to select a few of the best from thousands of plant people. In the training of *Opuntia* this selection was of greatest importance, for only those having the fewest or no thorns were the best. Sometimes only one out of a hundred thousand was saved. Year after year for nearly ten years this selection or choosing went on, before the benefactor's tireless eye began to see any great improvement. Then there were seven or eight of all the thousands, which had been in the school, that were not only free from thorns, but had the growing and feeding qualities, for which he had so long striven. They were children no longer now, but giant cacti, as tall as full grown men.

Their leaves were from ten to twenty inches long, from six to twelve inches wide and from one to two inches thick, and bearing delicious fruit. There was not a spine or spicule in all their rich meat. The woody fiber had partly disappeared, and the surface was as smooth as a watermelon.

Little *Opuntia*, the cactus child, was justly proud of these finely developed plant children, who were on the honor roll, and were now ready to go on to a higher education for usefulness.

## CHAPTER XXXV.

### OPUNTIA, ONE OF THE MOST FAMOUS PUPILS.

Just as all eyes of the plant people were turned upon the cactus child, when he entered the school, so are the eyes of real people now centered upon its offspring, the spineless edible cactus, which is among the greatest, the most wonderful and the most useful of all Burbank's plant children. It means the regeneration of much of the desert land—even of Sahara and the Great American desert. The story and greatness of its re-creation would make a large book. Some day, maybe, you can read its full history. We wish we could repeat it all here and now; but we can tell only some of the most interesting parts.

Sixteen years crowded with patience, infinite patience; and waiting, anxious waiting. No one but a genius with deep faith could have succeeded in this great task. No one has ever equaled it in plant improvement.

Not only are agriculturists everywhere interested in these useful plant children; but governments of all countries, where they can be grown, are taking measures to secure supplies of stock to provide against the possibility of all too frequent famines. For they can be planted and remain uncultivated and undisturbed, constantly increasing in size and weight, until needed, then each acre would preserve the lives of hundreds of animals or even human beings for months, until other food could be obtained. No class of plant people is easier grown. Quality of soil is of little importance. Cultivation is almost or quite unnecessary.

The old prickly pears produced as much as eighteen thousand pounds of fruit to the acre, and this was a common crop on the poorest soil. The best of the new Opuntias will sometimes produce more than one hundred and eighty thousand pounds of delicious fruit on the same space. It is the only forage plant that furnishes such an abundance of juicy, green feed the year round. Its big luscious slabs or leaves can be cut at any time, summer or winter, and they furnish water as well as nutritious food. This is the reason why intelligent people know full well that a new era in agriculture has dawned for continents like Australia and Africa, and for millions of the now useless acres in other countries.

Remember these spineless edible cacti are new plants—wholly new—the

product of the brain and hand of Luther Burbank. Do you think for a moment he could have accomplished this wonderful work without faith in himself and faith in the intelligence of plants?

Partially thorny ones have been grown for ages and cultivated for their fruit. But systematic training in the plant school shows how rapidly they improve under cultivation and how readily they adapt themselves to more fertile soils. Plant children are indeed like other children in this respect.

"But won't they run wild and grow thorns again, if they are planted on desert land?" asks one.

"Oh, no!" says Burbank, "their character is fixed by continued selection, as the characters of other new plants have been fixed. The little plants must, of course, have cattle kept from them until they are large enough, just the same as any young plant must be protected."

If turned loose on the desert to grow wild, perhaps, in defending themselves as their most ancient ancestors did, they might in a thousand years of fighting, grow spines again; but never while under the cultivation of man.

As children differ in their talents, so *Opuntia's* people vary in usefulness. Some are good for their fruit, others for forage, while some are useful for both. The greatest usefulness, perhaps, and one that cannot now be fully appreciated in its far-reaching benefits, is that of forage for all kinds of cattle and poultry, and especially for cows. The increase in both quantity and quality of milk is very marked when the *Opuntia* has been fed. It promises now to become one of the most important food producers of the age, and yet the work with it has only begun. If you should visit the plant school you would see thousands growing under the watchful care of the teacher for further development, and several years will yet pass before they are ready for graduation.

The fruit is very unique and attractive in appearance; and its flavor is rich, suggestive of the banana, the pineapple or the apricot. It is delicious, when, standing by the plants, it is eaten from the hand, or when served with sugar and cream, as a desert at meal time. It is also used as a salad, and may be baked as you bake bananas. It ranges in color, both skin and flesh, from almost white to deepest crimson. Some kinds are a light greenish with a crimson flush, while others are a deep orange, almost an amber. The general way of preparing the fruit for use is either to rub it off with a coarse cloth, or brush it off with a whisk broom, cut a thin slice from each end and run the knife through the skin from end to end. You can then curl the skin back easily, leaving the sweet flesh ready



for use. Or one may cut through the fruit from end to end and remove the flesh with a spoon. *Opuntia's* fruit is very wholesome and keeps well. It can be gathered and stored like apples.

Perhaps you have eaten candy colored with this fruit or ices colored with it, for these are among its many uses, while the leaves furnish a mucilage which makes a whitewash more lasting and the fiber is quite valuable for paper-making.

If you would like to grow some of these curious plant children in your garden, secure some cuttings in warm weather and lay them up to wilt for about a week. They will then root readily in any soil in a warm climate, for they just love to grow. Why, they would grow if you threw them down on the ground—even the blooms, buds or fruit will take root under the most trying conditions.

You can have several varieties from the earliest to the latest, and have ripe fruit in your own garden from June to the last winter months. The leaves would feed your poultry, and there would be any amount of pleasure for you in watching their rapid development.

You will remember that the cactus child longed to be useful and beautiful as was its forefathers in ancient times. Has it not realized its highest ambition?

## CHAPTER XXXVI.

### HOW NEW PLANTS ARE MADE.

“THE best way to learn all about the beauty and glory and magnificence of Nature is to work with your hands, as well as with your head. Help a rose, even a blade of grass, to grow more beautiful, and you will be a partner with God.”

—*Joaquin Miller.*

It is a good thing to make friends with Mother Nature and learn to know her trees and flowers well. They all have messages of love and cheer; then, too, we have so many things for which to thank the plant people—food, clothing, shelter, cooling shade and many more. And they are delightful companions. Books are the best of indoor friends, and trees and plants the best of outdoor friends.

Luther Burbank has learned to appreciate all this, for he says, “What occupation could be more delightful than adopting the most promising individual from among a race of vile, neglected orphan weeds, with settled hoodlum tendencies, down trodden and despised by all, and lifting it up by breeding and education to a higher sphere? To see it gradually change its sprawling habits, its coarse, ill-smelling foliage, its insignificant blossoms of a dull color to an upright plant with handsome glossy, fragrant leaves and blossoms of every hue and with a fragrance as pure and lasting as could be desired?”

Can you imagine anything more delightful? Would you not like to try? The work which Luther Burbank has done so successfully and is still doing, you may begin to do now. You need not wait until you are grown. You may begin this very day to study plant life; and you might make some wonderful discovery even before you are out of school that would make the world richer by far.

Try to put yourself in the place of a plant. Perhaps it is wild and would be made tame; or it has an unpleasant odor and desires a sweet fragrance. It may have an unattractive flower which it wishes bright and beautiful. If a fruit, it is sour and wants to be made sweet. It might be a berry full of hard seeds that hurt its feelings and it would like them removed; or a nut that would be useful but for its puckery bitterness. Burbank has changed all of these things and many

more. He says, "I have no magic or secrets to impart, I simply learn and follow Nature's laws."

Every boy or girl should have a little garden of his very own, for many happy moments are found among plant friends. Then what a pleasure to pick some flowers or pull some radishes for mother that grew in your own garden! If some time that little garden became a plant school with you as the teacher, and you could go to mother with a lovely flower, unlike any that had ever been known before, and exclaim proudly, with joy in your heart, "Oh, mother, see my new flower! I made it grow, or at least I helped Mother Nature make it grow," would it not be great?

Now, pay close attention and try to understand how the teacher of the plant school works. Remember the work must be done just right and you must be very patient, for Mother Nature never hurries things. You will soon find how fascinating the work is; and, as it must be done in the open, it is very healthful.

New plants are produced by selecting or choosing, year after year, the one plant among many of its kind, which has an especial quality that you desire, and saving the seeds from this one plant only, instead of planting seeds from every one. In this way by selection alone, you can make the blooms larger, change their color, lengthen or shorten the stem; and make many other changes. Fix firmly in your mind the improvement you wish, then keep right on and the desired result is sure to come.

This process can sometimes be greatly hastened by crossing two plants, which are closely related but have different qualities, unlike in size or color; but both of which have tendencies toward the ideal plant that you have in your mind to create. To understand what is meant by crossing, you must recall some things you have learned about the parts of a flower and the uses of these parts. Every symmetrical flower has sepals, petals, stamens and a pistil and several pollen-bearing anthers. In order for a plant to produce seed, pollen must fall upon its stigma. It seldom happens that the pollen of a blossom fertilizes its own seed. Nature has many interesting ways of preventing this, which, we are sure, you will enjoy studying out for yourself. Many of the most beautiful truths about plants are made known only to those who love plants and observe their ways closely. Nature has many pollen-carriers, you know—the bees, the wind and many more—to bring the golden dust from other flowers, when the flower is ready to receive it. The pollen is believed to be a food for the seed.

If you should plant white corn near a field of yellow corn, many ears

would be found to have both white and yellow kernels, for the wind has carried pollen from the yellow corn tassel to that of your white corn, and so the seeds become crossed or mixed. This crossing is continually going on everywhere in nature, and thus each plant has an individuality, no two being exactly alike. Although to most persons all buttercups or daises look alike, they vary in many ways. There is as infinite variety in flowers as there is in human faces.

Usually when we speak of crossing we refer to the work of man in combining two plants with a direct object in view. An apple blossom will illustrate how this crossing is done. The only tools you will need are a good microscope, a tiny saucer to hold the pollen and a small, sharp knife. Some morning, when the flowers are about to open, gather the anthers of several blossoms from one tree and place them upon your saucer to dry. The pollen will soon shake off. The blossoms on the other tree to which you wish to apply the gathered pollen, must not be open or in full bloom, lest some pollen-carrier has been there first. Carefully cut from the blossom, with your little knife, the anthers leaving the pistil uninjured. Then dip the tip of your finger into the pollen in your saucer and place it gently upon the stigma of the flower, which you have prepared to receive it. It will hold the yellow dust fast. There is nothing now left to attract a pollen-carrier to the fertilized blossom, for its bright petals are gone, and there is no footing left for the insect to light upon. It would be well to place a tag upon the bloom so that you can watch it closely and carefully save the seeds when they ripen. These seeds will be combinations of the two varieties crossed. Plants from them will, no doubt, vary greatly, giving an opportunity for selection of the best from the seedlings.

This process of selection of the best plants should be carried on faithfully for several years or generations in order to fix any quality in either fruit or flowers.

The seedlings from combined plants furnish a fine study, as the variation is so great. Some may be superior to either parent or they may be valueless. One of the main objects of crossing is to produce this variation, from which selection may be made. In the second generation the variation may be still more marked than in the first.

The work of plant improvement is beyond comparison with any other chosen occupation, owing to the delight it gives one and the happiness it adds to the human race.

## CHAPTER XXXVII.

### THE SEED ROOM.

WOULD you peep into the large, light seed room? If so, come with us. Here are shelves at the sides of the room from floor to ceiling on which the seeds are arranged alphabetically. No doubt, you can readily tell some of the seeds on the A and B shelves, but what seeds fill the X, Y and Z shelves?

The larger and heavier seeds are in strong cloth bags, then there are paper bags of all sizes down to the little seed packages seen on sale in the stores.

On the long work-table is a pair of very delicately balanced scales, and tiny measuring cups, some of which are less than one-fourth the size of a thimble; yet some seeds are too small for even this measure and are lifted on the point of a penknife.

The larger part of these seeds were grown on the experiment farms; and, after having been carefully gathered, dried and cleaned, are brought here to be weighed, measured, assorted, plainly labeled, listed and placed on the shelves. In handling seeds the greatest accuracy and most perfect system is required, as any confusion would result in serious trouble. Here, as in all the departments, careful memoranda are made, giving time of planting of each kind, and other points which must be observed. These seeds are for next season's planting for experimental purposes. Any, however, not required are either sold in bulk to the large seed-houses or put up in small packages for the retail trade.

Be careful, as you pass the table, for with a breath you might blow away the value in many dollars of those tiny, feathery seeds; and some are priceless, perhaps the only seeds of a new variety, which cannot be replaced.

Some choice lilies were once growing near the road at the Gold Ridge farm. One morning the gate was left open for a short time, and a child passing saw the lilies and broke one off, doubtless intending no harm. The children are generally very careful not to injure Burbank's plants, well knowing that he is always glad to fill their arms with flowers when he has time to gather them. Therefore the little girl did not take the most beautiful lilies, but one stalk having only a few fresh blooms at the top of the long stem, which was becoming ragged with faded flowers and ripening seed pods. It chanced that for this very seed the master

had waited years, as it was the combination of two choice lilies, which bloomed at different seasons. One opened its beautiful flowers in early spring, while the other came in summer. In order to make the combination, the habit of each must, by long continued training, be changed. Year after year, one of the lilies had been trained to bloom a little later each season, and the steps of the other had been hurried, until June of that year found each with opening petals. Then the golden pollen had been brought from lily number one just as lily number two was ready to receive it. But now, by one thoughtless act, the work of years was undone, and the precious seed was gone. Can you imagine his grief when he discovered the loss, knowing as he did that no seed like it had ever before existed? A careful search was made to discover if even one seed could be found. The faded flowers and seed pods had been hastily stripped from the stem and thrown down upon the sandy soil as worthless. A few of the precious seeds were rescued and the experiment saved to science.

What curious packages! Yes, those seeds were gathered by children in South America; those are from the mountains of China; and there are many others that speak to us of distant lands and of strange scenes and customs. Then what treasures are here! Can you imagine the mischief one little mouse might do in this room? Giant trees, sturdy shrubs and fragile flowers are sleeping here. Can you tell what plant is hiding in this seed? Its character, its past history and a prophecy of its future growth are written in its structure and may be read by a skilled observer. As Burbank holds a seed in his hand, he knows its nature and understands what conditions are necessary for its germination and development.

Some seeds may be kept for years, others must never be allowed to become dry. Some will germinate only under glass, requiring the warmth and moisture of the conservatory; others must be boiled in water for five or ten minutes, while still others must be frozen in order to allow the little plantlet to escape from the hard shell. The conditions required depend largely upon the environment of its ancestors; seeds of plants from tropical countries requiring very different treatment from those of the colder regions. There are, however, many other points to be considered, for seeds have many strange and interesting habits. Near the geysers in California, where forest fires are frequent, there grows a kind of pine having cones that never open until a fire has burned over the hillsides, destroying the vegetation. Then these cones burst open, the seeds escape from their prison houses and, falling upon the ground, now cleared to make room for them, thick forests of young pines spring up.

A seed is an egg, a plant egg; for within the shell or covering is a little undeveloped plant; and snugly packed with it is a supply of food for its nourishment, when it first awakens, before it becomes able to gather its own nourishment from earth and air. The different parts of a seed can be readily seen with the aid of a good pocket microscope, which one is well repaid for carrying, as it reveals much of wonder and beauty in the varying structure of seeds, almost equaling that of the flowers. And seeds are everywhere. They float on the water, fly in the air, carpet the earth and sleep in the ground beneath our feet. Without the product of seeds the earth would be brown, not green. In seeds lie sleeping a future generation of plants, only awaiting certain conditions of moisture, heat and light to awaken them.

The destruction of a blossom prevents the development of the seeds. Have you ever seen a flower blooming in field or forest, with joy written in its every line of beauty, ruthlessly torn up and thrown down by the dusty roadside? Did you watch it shrink, shrivel and die? No seeds were ripened for another season's growth. In just this way many of our most beautiful wild flowers are becoming each year less plentiful.

Although the life of each plant begins and ends with the seed, yet each has a definite work to perform. They are sometimes spoken of as idly dancing in the sunshine. In reality they are very busy creatures, no doubt finding joy in their work. The poet Wordsworth says,

"And 'tis my faith that every flower  
Enjoys the air it breathes."

Not only do plants in the days of summer gather nourishment for their own life and growth and prepare food for the little embryo plants hidden in the seeds; but it is to their industry that we look for our food, and much of our clothing, fuel and shelter. If for one season they ceased to work, there would be no life on the earth.

The population of the world is increasing. Cities are growing very rapidly and food is becoming each year higher in price. Better and larger crops must be produced. It is then to better and more productive seeds that the nations are looking for food for their increasing millions.

Now, let us consider what would be the result in the food supply, if in the grains alone, snugly packed in each little plant nest, there might be only one more egg. The master tells us that if a new wheat, barley or oats could be obtained that would produce one more grain to each head, or a corn that would produce

an extra kernel to each ear, in the United States alone, we would have annually, without any more cost or labor, 5,200,000 extra bushels of corn, 15,000,000 extra bushels of wheat, 20,000,000 extra bushels of oats and 1,500,000 extra bushels of barley.

May your work in coming years be, like that of the master, adding to the beauty of the earth and to the food of the nations; and so hastening the "happy day when man shall offer his brother man, not bullets and bayonets, but richer grains, better fruits and fairer flowers."



## CHAPTER XXXVIII.

### LUTHER BURBANK'S CHILDHOOD.

ON the seventh of March, 1849, as the snow was beginning to melt on the gently sloping New England hillsides, Luther Burbank began the rich life so full of messages for the flowers. The pink and white buds of the fragrant trailing arbutus were only waiting for a few sunny days and some one to love them that they might come forth from their hiding places under the green leaves; and no child ever loved them more than Luther Burbank.

The Burbank family lived in the beautiful and historic town of Lancaster, Massachusetts; beautiful because of its great elm trees and picturesque scenery, and made historic by its connection with Indian life in the seventeenth century. The home was a large brick house, set some distance back from the road. Over it swayed the graceful branches of a great elm tree, in which every year the golden orioles hung their swinging cradles and poured out their notes of joy.

In the summertime the yard in front of the house was aglow with bright flowers; and during the cold winter months geraniums, fuchsias and pinks bloomed in the windows of the cheery living room. Even as a baby the child loved these flowers, and nothing pleased him more than one of these bright blossoms placed in his hand. He never destroyed it; but if a petal fell, the baby hands tried to replace it, that again the flower might be perfect.

Once, when he was beginning to toddle about, he was found in the yard patiently endeavoring to reset a little plant in the ground. At first it was thought that he had pulled it up and was trying to undo his mischief; but it was soon learned that the uprooting of the plant was the work of another, and that it was only his grief at its destruction which led to his efforts to make it grow again.

Soon the wild flowers around the home became his companions and playmates. On the hillside, under the elm tree in front of the house, grew some wild daisies. These he watered and cherished when he was so small that he could scarcely carry the little pail of water up the steep. The daisy faces became brighter because of his love and care.

Luther was a timid child, shrinking from strangers. When there were guests at the home that he thought might be at the dinner table, he would count the

plates, before he learned the numerals, by designating them as, "papa's," "mama's," and so on through the family. If more places were found than he could count thus, he would say, "I don't want any dinner," and quietly slip away with his old maltese cat, whose sympathy he sought in all his troubles.

The work of caring for the bantam chickens, Guinea pigs, white rabbits and other pets of the household, was early assigned to him; for each member of the family was given some task suited to his age and strength. He was fond of these animals, but even then the stronger love for growing plants was noticeable. No flower was commonplace to him. The lupine, the goldenrod and the buttercup growing by the wayside charmed him. Like the poet Whitman he felt that,

"The running blackberry vine would adorn the parlors of heaven."

Near the home was a bank of clean, white sand, where the boy Luther spent many happy hours, playing with the other children. He laid out villages with streets, houses, mills and stores; but always with orchards and gardens, for even his play was constructive, tending toward increased beauty by the use of plants.

School life for Luther Burbank began in the district school near his home. In a small brick building, nestling among pine trees, fifty or more boys and girls of varying ages and grades were under the charge of one teacher. With trees to climb, hills to coast, a pond near by for swimming in summer and for skating in winter, the hours of play were as full as the hours of study.

His first teacher in this school was an older brother, Herbert, who used to take the little fellow with him. Sometimes when the snow was too deep for little feet, after the mother had put on his coat, cap and mittens, tied a warm scarf over his ears and kissed him goodbye, this brother would draw him to school on his hand-sled. He was, at that time, too young for school life, and being a sensitive child, shrank from the fun and laughter of the older boys; but the sled ride was heartily enjoyed.

It happened that the next teacher in this school was his sister Jane; and, although she was very proud of Luther, she found it very difficult to induce him to recite the lessons, which she knew he had mastered perfectly.

Soon, however, he was at ease with his little school mates, and with them blew the dandelion heads, to "know if mother wants you," held the shining buttercups under each other's chin to "see if you love butter," and whistled with blades of grass. He made popguns from elderwood, whistles from willows, bows and arrows from beech and hazel, and toy canoes from the bark of the white birch.

He knew the spruce trees in the swamp, where the best chewing gum could be found. He knew the sweet birch and sassafras trees with spicy bark, the ferns and sweet flags with edible roots; and in learning the uses of the various trees, plants and herbs, that grew near his home, he formed habits of observation, which have proved of the greatest value in his life work.

It was he, also, who led the little band of barefoot boys and rosy-cheeked girls where the sweetest strawberries hid in the meadow grasses, the biggest blueberries grew in the woodland pasture and where the finest hickory nuts and chestnuts might be sought among the rustling leaves. Thus, as he turned the leaves of the great book of nature, over and over, the timid boy developed into a leader; and, in this close intimacy and harmony with out of door life, learned to read much of the finer and more delicate tracing of the hand of God.

At home he had the cows to drive to pasture, the chickens to feed, wood to bring, weeds to pull and a thousand tasks so well-known to a boy on a farm; for a wise father kept him busy, yet he had time to build windmills, waterwheels and to repair broken sleds and skates. With the song of the robin and thrush to awaken him in the morning and a chorus of green-coated frogs to lull him to slumber at night, life was rich in the wealth of nature's gifts to a country boy.

Through the meadow ran a rippling stream. There his bark canoes were floated, his waterwheels placed, as he waded in its clear waters among the nodding heads of golden cowslips; and on its banks he gathered the cranberries reddening in the sunshine, questioning why those hiding in mossy places were of paler hue.

Sometimes with older brothers he strolled over Pine hill for a swim in the smoothly flowing Nashua river, coming home with pockets filled with "shag-bark" nuts from the scattered trees growing on the interval land; nor did he forget to gather from the rushes an armful of cat-tails to place with wild roses in the large living room. Then there was boating on the quiet wood-encircled Cum-berry pond. While the others fished, the boy gathered the buds of the beautiful white pond lilies resting on its surface; and, which opening next morning filled the rooms with their fragrance.

But always dearest to him were the autumn days, when trees and vines were robed in russet, scarlet and gold; and when the flowers began, one by one to close their eyes, making ready to lie down to sleep beneath a coverlet of snow.

One of his first treasures purchased with his own earnings was a good mi-

roscope, with which he studied the tiny mosses and lichens on the old stone walls, and which revealed to him some of the beauty of the flowers hidden to the unaided eye.

He early formed a taste for reading; for the home was well supplied with books. The weekly visits of the "Youth's Companion" (then a much smaller paper than now), were welcomed by him, as by so many boys and girls since that time. The town of Lancaster had an excellent public library, and no one appreciated it more than did Luther. He read books of natural science, entering eagerly into the study of each. For a time geology and the study of rocks occupied all his leisure moments. A slate quarry near by, the clay banks with varied colored strata and the great granite boulders of Rollstone hill were examined with care.

Chemistry and physics, each in turn, held his thought, while he experimented with an old tea-kettle in the back yard, making steam whistles and toy engines. Astronomy and evenings with the stars followed. Falling meteors, the milkyway, and the aurora borealis, all were phenomena of the most intense interest to him. He excelled in freehand drawing and in painting in oil colors, for into each study he threw his whole soul, and whether work or play occupied his attention, he had the habit of concentrating all his energy upon one thing at a time.

When fifteen years of age he entered Lancaster Academy, becoming a general favorite with teachers and classmates; and there he studied several winters. Each day he walked to the academy, which was three miles from his home; often retracing his steps in the evening to enjoy an hour's practice in the gymnasium, as he was extremely fond of athletics.

The summer months were spent in the city of Worcester, learning the mechanics trade. He was faithful in the work in the great noisy plowshops, even excelling in it; yet letters written at that time to the loved ones at home, speak more of the beauty of the earth and sky, of the music of the birds and frogs, than of city life and the sound of machinery.

After leaving the academy, for a time he studied medicine and hygiene. This, as well as the other sciences, he endeavored to put into practice and to demonstrate the knowledge acquired; and by so doing, no doubt, built up and strengthened a naturally frail body.

Notwithstanding all these interests, the message to the plant world must be given; and at the age of twenty-one he had begun his great life work, the training of plants to greater usefulness and beauty.

“And Nature, the old nurse, took  
The child upon her knee,  
Saying, ‘Here is a story book  
Thy Father has written for thee.’

‘Come, wander with me,’ she said,  
‘Into regions yet untrod;  
And read what is still unread  
In the manuscript of God.’

And he wandered away and away  
With Nature, the dear old nurse,  
Who sang to him night and day  
The rhymes of the universe.

And whenever the way seemed long,  
Or his heart began to fail,  
She would sing a more wonderful song,  
Or tell a more wonderful tale.”

—*Longfellow.*

## CHAPTER XXXIX.

### QUOTATIONS FROM LUTHER BURBANK.

Let us be brave harvesters in the broad field of thought.

Be gentle, and gentle people come to you from near and far.

Facts are living souls; ceremonies are cerements—the old clothes of facts.

Ignorance is the only unpardonable sin.

The man who cannot say no never gets the opportunity to say yes.

Plastic child-nature absorbs your intent, not your words.

No man ever did a great work for hire.

I hope no one will ever be worse for my having lived.

Flowers always make people better, happier and more hopeful; they are sunshine, food and medicine to the soul.

Education and selection are the greatest forces in the production of all these fruits and flowers.

Be just and generous, and the world sends you just and generous companions and friends.

The farm is the foundation of our best manhood and womanhood, the true hope and strength and glory of the world.

In these United States of America each citizen is a king. Each counts one unit in the destinies of city, state and nation.

We are now standing upon the threshold of new methods and new discoveries which shall give us imperial domain.

There is not a single desirable attribute, which, lacking in a plant, may not be bred into it.

You may have observed the fact that man succeeds just in proportion to his ability to get his head and hands into close partnership.

The greatest happiness in the world is to make others happy ; the next greatest is to make them think.

I shall be content if because of me there shall be better fruits and fairer flowers.

It is very natural that we should associate flowers and children, as they are so much alike in many respects, and should in some points be treated alike.

Cultivate kind, gentle and loving thoughts toward every person, animal and even the plants, stars, ocean, rivers and hills.

Education should always be the guiding of a natural appetite for facts, never a hastening process.

Science brings peace and good will to man with better home and food and clothing, better books and schools and libraries and better laws and better health and better lives with more warmth and light and hope.

Fidelity, truth and wisdom, combined with labor, are the foundation stones of society ; and the building of healthy, happy homes the highest aim and object of human effort.

Choose what improvement you wish in a flower, a fruit, or a tree ; and, by crossing, selection, cultivation, persistence, you can fix this desirable trait irrevocably.

Repetition is the best means of impressing any one point on the human understanding ; it is also the means which we employ to train animals to do as we wish ; and by just the same process we impress plant life.

If we love and admire our friends, let us tell them so today. It does them no harm, and they will pass along the kindness. Yesterday is not ours, tomorrow may not be, tell them today.

Any form of education which leaves one less able to meet everyday emergencies and occurrences is unbalanced and vicious, and will lead any people to destruction.

If it be worth while to spend ten years upon the ennoblement of a plant, be it fruit, tree or flower, is it not worth while to spend ten years upon a child in this precious formative period fitting it for the place it is to occupy in the world.

There is no barrier to obtaining fruits of any size, form or flavor desired; and none to producing plants and flowers of any form, color or fragrance. All that is needed is a knowledge to guide our efforts in the right direction, undeviating patience and cultivated eyes to detect variations of values.

Every great man or woman is at heart a poet, and all must listen long to the harmonies of nature before they can make translations from her infinite resources through their own ideals into creations of beauty in words, forms, colors or sounds.

Man is slowly learning that he too many guide the same forces which have been through all ages performing this beneficent work which he sees everywhere above, beneath and around him in the vast teeming animal and plant life of the world.

During the course of many years of investigation into the plant life of the world, creating new forms, modifying old ones, adapting others to new conditions, and blending still others, I have constantly been impressed with the similarity between the organization and development of plant and human life.

Music is fundamental, one of the great sources of life, health, strength and happiness. It is one of the voices of nature—a voice of soul to soul adapted to every mood. Music releases the soul from its mortal shell and takes it to brighter skies, new oceans, mountains, flowers, birds, trees and brooks, where time and space do not intrude.



In dealing with flowers, we are obliged somewhat to adapt ourselves to them, so with children. All flowers cannot be treated alike. They have their peculiar habits and tendencies; and utter failure will be at once encountered, if we attempt to treat all alike. And another fact applies to both, you must be sincerely honest with them.

Every child should have mud pies, grasshoppers, water-bugs, tadpoles, frogs, mud-turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade, water lilies, woodchucks, bats, bees, butterflies, various animals to pet, hay fields, pine cones, rocks to roll, sand, snakes, huckleberries, and hornets; and any child who has been deprived of these has been deprived of the best part of his education.

It was once thought that plants varied within the so-called species but very little, and that true species never varied. We have more lately discovered that no two plants are ever exactly alike, each one having its own individuality, and that new varieties having endowments of priceless value, and even distinct new species, can be produced by the plant-breeder with the same precision that machinery for locomotion or other useful purposes are produced by the mechanic.

I have here a plant school—an academy for fruits, flowers, berries, vegetables and trees—and I am trying to teach my scholars how to develop their good natural qualities and to learn other virtues. I am trying to train them for greater usefulness; to teach them new virtues, new qualities, which will make them better and brighter, which they can pass along to the next generation, just as if they were men and women.

In the study of the life of plants, both domestic and wild, we are surprised to see how much they are like children. Study their wants, help them to what they need, be endlessly patient, be honest with them, carefully correcting each fault as it appears, and in due time they will reward you bountifully for every care and attention, and make your heart glad in observing the result of your work.

Science sees better grains, nuts, fruits and vegetables, all in new forms, sizes, colors and flavors, with more nutrients and less waste, and with every in-

jurious and poisonous quality eliminated, and with power to resist sun, wind, rain, frost and destructive fungus and insect pests; fruits without stones, seeds, or spines; better fiber, coffee, tea, spice, rubber, oil, paper and timber trees, and sugar, starch, color and perfume plants. Everyone of these, and ten thousand more, are within the reach of the most ordinary skill in plant breeding.

To secure real knowledge, it is necessary to listen sincerely and patiently to Nature, not try to bend her to our crude notions of how she should perform her miracles. Be patient, try to get the truth always on all subjects, do not depend wholly on books; for knowledge thus obtained, although useful, can never take the place of your own personal observation and effort. Those who labor with hands, feet or brains are the real saviors of the nation and the home. Idleness, selfishness, and dishonesty will in all cases lead to crime, poverty and disgrace. Individuality, sincerity, manly and womanly courage to stand by our convictions, are necessary for any success.

I love sunshine, the blue sky, trees, flowers, mountains, green meadows, sunny brooks, the ocean when its waves softly ripple along the sandy beach, or when pounding the rocky cliffs with its thunder and roar, the birds of the fields, waterfalls, the rainbow, the dawn, the noonday and the evening sunset,—but children above them all. Trees, plants, flowers are always educators in the right direction, they always make us happier, and better, and if well-grown, they speak of loving care and respond to it as far as is in their power; but in all this world there is nothing so appreciative as children,—these sensitive, quivering creatures of sunshine, smiles, showers and tears.

Who can estimate the elevating and refining influence and moral value of flowers, with all their graceful forms and bewitching shades and combinations of colors and exquisitely varied perfumes? These silent influences are unconsciously felt even by those who do not appreciate them consciously; and thus with better and still better fruits, nuts, grains and flowers will the earth be transformed, man's thoughts turned from the base, destructive forces into nobler productive ones, which will lift him to higher planes of action toward that happy day when man shall offer his brother man, not bullets and bayonets, but richer grains, better fruits, and fairer flowers.

Growth within, is health, content and happiness; and growing things without stimulate and enhance growth within. Whose pulses are not hastened, and who is not filled with joy, when in earth's long circling swing around our great dynamo, the sun, the point is reached where chilling, blistering frosts are exchanged for warmth and growth! When the flowers and grasses on the warm hillsides gleefully hasten up through the soft, wet soil, or later, when ferns, meadow rues and trilliums, thrilled with awakened life, crack through and push up the loose, mellow earth in small mounds—little volcanoes of growth; all these variously organized life forces are expressing themselves each in its own specific way.

## CHAPTER XL.

## PROGRAM.

MARCH 7TH, the birthday of Luther Burbank, was in 1909 designated by the Governor of California as arbor day to be observed in the public schools of the State by planting trees, vines and flowers, and by appropriate literary exercises. In many other states the day is also observed in the same way and proves a source of pleasure and is an inspiration to make homes as well as schools more beautiful.

The following may be an aid to the teacher and can be adapted to the different grades.

In decoration of school-room, use as many Burbank creations as are at hand, fruit, flowers, etc. Live flowers growing in pots or boxes are to be preferred to cut flowers. Pictures of the scientist, his home, and experimental grounds may be placed on the wall. Fruits and flowers drawn in outline are excellent black-board decoration.

## Poems—

“Painter of Fruits and Flowers,” *Whittier*.

“Birthday of Agassiz,” *Longfellow*.

“Building of the Birch Canoe,” *Longfellow's “Hiawatha.”*

Sonnet, “Luther Burbank,” *Mary Belle Williams*.

Luther Burbank's Life Story:—Childhood, school days, incidents, work methods, achievements.

Burbank quotations by older pupils.

Story of his creations:—Shasta daisy, cactus, plumcot, *Eschscholtzia*, and others. The children may represent each of these plants.

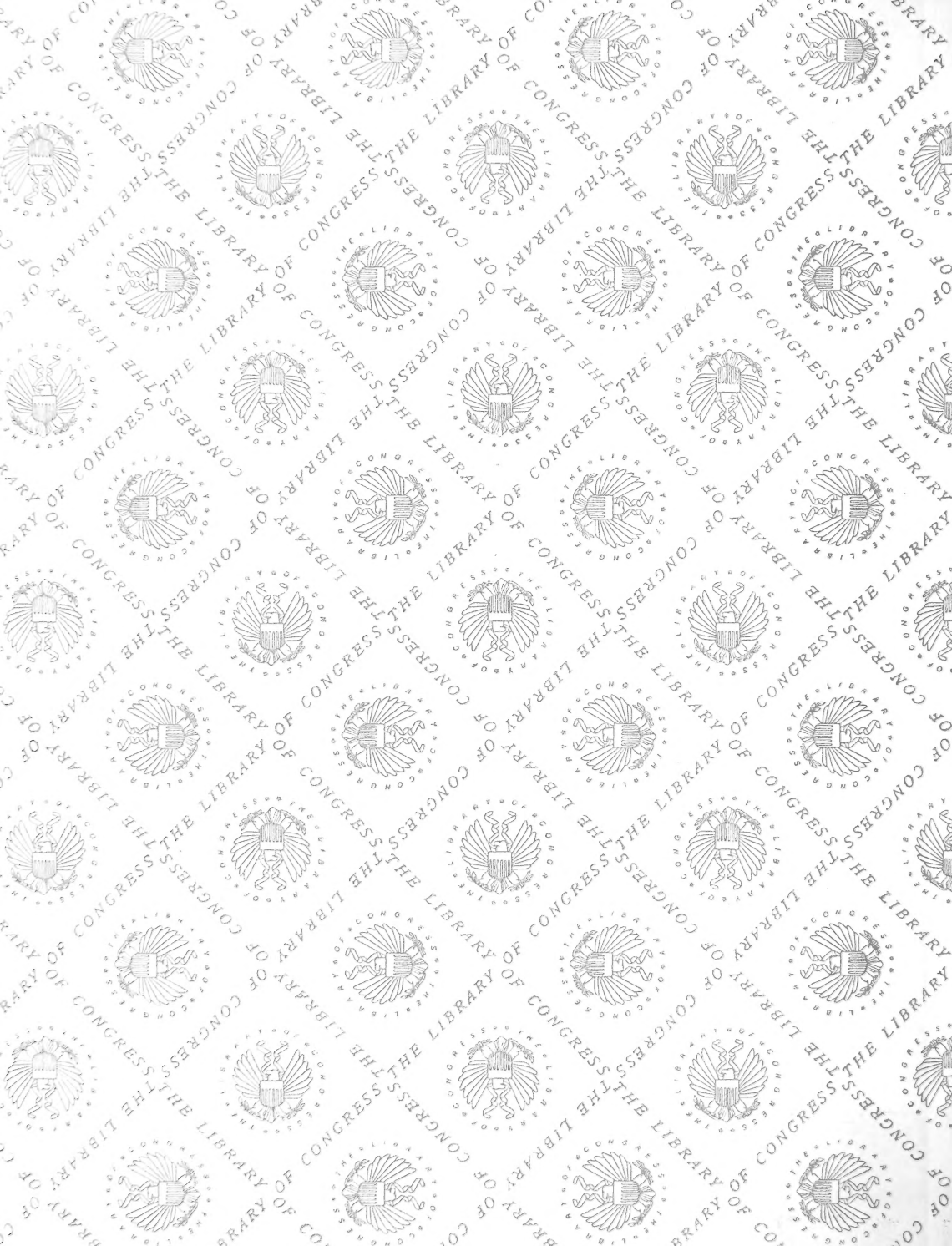
Music to be selected by the teacher.

Planting of a Burbank tree and other trees and plants. At this time the teacher should emphasize the care of these plants and see that they do not suffer neglect as the months pass.

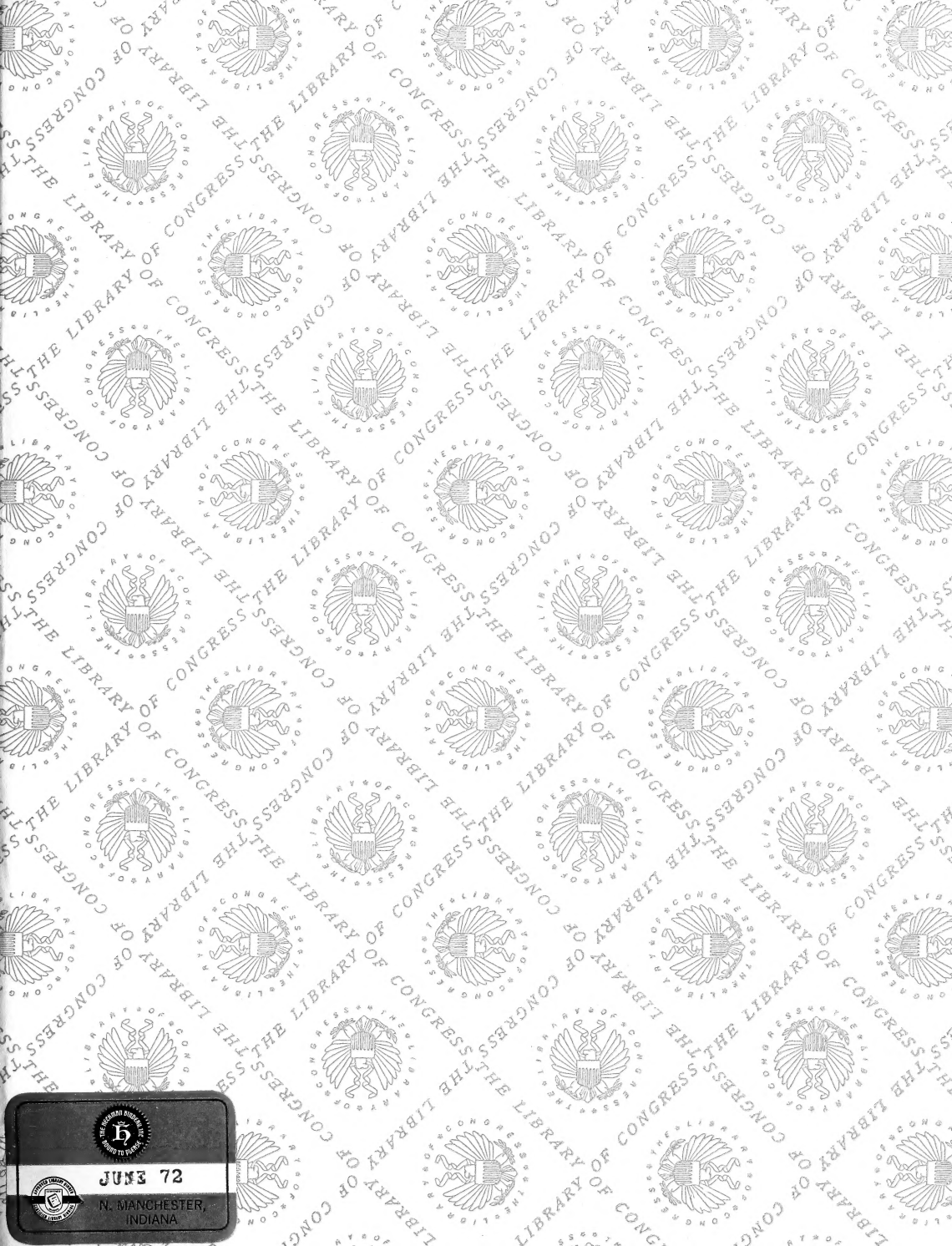












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