

# SPRINGTIME FLOWERS



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RUTH  
NORCROSS

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"WHOLL BUY?"

*Meyer von Bremen.*

# SPRINGTIME FLOWERS

EASY LESSONS IN BOTANY

BY

MAE RUTH NORCROSS

*WITH ILLUSTRATIONS*



SILVER, BURDETT & COMPANY

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TO  
MY LITTLE SISTER  
EVA C. NORCROSS  
THIS VOLUME IS AFFECTIONATELY  
**Dedicated**

*Your voiceless lips, O flowers, are living preachers,  
Each cup a pulpit, each leaf a book,  
Supplying to my fancy numerous teachers  
From loveliest nook.*

—HENRY WADSWORTH LONGFELLOW.

## PREFACE

THIS little book is presented to the public in the hope that it will fill a need such as the writer, in her own experience in both the home circle and the schoolroom, has found unsupplied.

Children all love flowers, and if their natural interest can be cultivated by the stimulus of a little knowledge, this love may be largely increased. This volume is designed as a beginning in the study of a science which in later years becomes both interesting and profitable, and the lessons have been prepared in as simple a form as possible.

Only flowers well known throughout our country have been used as illustrations, and it is believed that, by analyzing them, as did the little people in our story, children will begin to notice almost unconsciously the details of each new plant brought to their attention.

If this book is the means of helping the busy teacher or mother to awaken in her young people an interest in botany, the aim of the writer will be accomplished.

MAE RUTH NORCROSS.



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# SPRINGTIME FLOWERS

## CHAPTER I.

### HOW IT ALL CAME ABOUT



THE Burtons had always lived in town, and, except for the short visit paid to Grandpa each summer, the country was to the little people an unknown paradise, filled with Nature's beautiful creations, which far excelled in their opinion any of the splendors of the city.

One winter, however, there had been much illness in the family, and Mamma Burton looked pale and tired from her long work of nursing, which, careful and patient though it had been, failed to bring the roses back to the cheeks of her little flock. The old family doctor finally decided that nothing less than a complete change of air would bring about the desired result. So it was at once decided that, though early in April, there could be no more delightful place than Grandpa Allen's farm, and preparations for departure were commenced forthwith.

Mamma laughingly declared that the old adage about anticipation was based on truth, for the bustle and pleasure of getting ready for the trip did much more towards bringing about a cure than all the bitter medicine which Dr. Carlton had prescribed.

At last all was ready, and, despite the pale faces, it was a merry party that Papa Burton escorted to the station one April morning to take the train for Pleasantville.

First came Mamma, who, aside from her own desire to be again in her childhood's home, was sharing in the enthusiasm of her little folks. Anna, the eldest child, was a very studious little maid of twelve, whose demure, careful ways made her a great help to Mamma, and won for her from her father the pet name, "Little Mother." Charley was a merry, mischievous boy of ten, who, however, shared with Anna a great fondness for books. And last, but not least, was Baby May, a golden-haired little fairy who for three years had been the pet of the family.

As they rode along, all were intent upon watching the changing landscape, which seemed to be running away from them; and even May began to strain her eyes, long beforehand, for a glimpse of "Danpa's house," which they knew contained a hearty welcome for them all. When at last they reached Pleasantville and saw Grandpa and his hired man waiting to help them into the spring wagon, even demure little Anna fairly shouted with delight.



As it was early spring, the ground was almost entirely bare save for an occasional small patch of snow which reminded Charley of a white sheep lying upon it. Anna noticed, however, that some of the trees which they passed seemed almost ready to put forth their buds.

Anna was a high-school girl, and had she been able to keep on with her class, she would have begun to study botany that spring. Missing this was her one regret at leaving town; but this feeling speedily vanished the day before their journey, for when Papa came to dinner, he brought with him a handsomely bound herbarium, a reliable text-book on botany, and a microscope, and said, "Now, little mother, you shall have a chance to study botany right. Botanize to your heart's content, and teach Charley also."

## CHAPTER II.

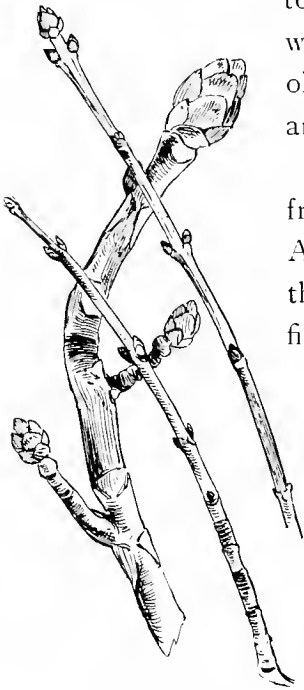
### LEAF BUDS—BABY LEAVES

ONE day when Charley came in from a walk with Grandpa, he brought with him a large bunch of what he had taken to be some kind of flower buds. They were in pretty shades of light brown, old-rose pink, and gold velvet and satin, and they had a sweet, spicy smell.

“Oh,” said Anna, as she took them from his hands, “these are leaf buds. Aren’t they lovely?” and she sniffed their fragrance and drew her dainty fingers over their silky surfaces.

“Then, won’t they open into pretty flowers?” asked Charley, disappointedly.

“No, not these. They will only open and give out leaves by and by. There are pictures of them in my botany, and I read all about them the other day. Wait a minute and I’ll get the book and see what it says, and



LEAF BUDS

we'll open one of the buds, and look at it through my glass."

She soon returned, bringing both book and glass, and then began, "Now, Charley, you see there are several different kinds of buds, and we can study leaf buds before we are able to get flower buds. The stem of a plant continues its growth by means of its *terminal* bud, that is, the bud that seems to be the end of the stem. Every branch begins from the buds that grow on the sides of the stem. These are called *lateral* buds. The branches in most trees are only repetitions of the main stem, so that after a while the lateral bud of the main stem becomes the terminal bud at the end of a branch which bears lateral buds of its own; and these, as the tree grows each year, develop branches and become terminal buds in their turn. Now, here," she continued, selecting a stem with three branches, "is an example of what I have said. All three of these branches have terminal buds on the ends and lateral buds on the sides. A year or two ago this was only a single stem, and what is now the middle one was much shorter then, and bore a terminal bud, and lateral buds on the sides, and it is from the lateral buds that these other two branches grew."

"Oh, I see," said Charley; "and if I hadn't pulled this, both of these branches would have had others growing from the lateral buds on their sides next year."



TERMINAL  
BUD

“Yes, that is the way exactly; and then branches keep on growing from buds each year, and so the tree gets to be larger



LATERAL BUDS

and larger, and to have so many branches that you can't tell sometimes which was the starting stem. Now, let us cut this bud and see what is inside of it. In a couple of weeks all these little pieces that look like velvet and satin, and are called *scales* in the botany, will turn back and drop off, and the leaves will then be out. Some buds will have only one leaf or the foundation of a leaf in them; but large, strong buds like these will have a whole cluster of little leaves folded

up in them. The buds you see are the satin-lined cradles in which the baby leaves, which were formed the year before, are rocked and kept warm all through the cold winter. The babies have their food packed with them. That is, there is enough nourishment packed in each bud to nourish the leaves as they grow larger and larger, until, after a while, when spring comes, their pretty cradle gets too small for them, and they burst it open and come out as full-grown leaves. Lend me your knife, and we will cut the bud and see how much we can see inside of it.”

Anna cut the bud lengthwise, and, placing it under the glass, bade Charley look at it, which he did.

“Oh, how funny!” he exclaimed presently. “I can see

the leaves and the stems quite plainly, but the stems are all hairy, and the leaves are curled up so that they look like little green baby mice. Aren't they cunning? Call May and let her see them too."

Baby May was very willing to take a peep at the baby leaves, and admired them quite to Charley's satisfaction.

"I think these must be the babies meant in the song,

'Rock-a-bye, baby, on the tree top,  
When the wind blows the cradle will rock,'"

said Anna, as she showed them to May.

"And zen when ze bough b'eaks, do zey all fall down and dit tilled?" asked Baby May sympathetically.

"Yes, I guess so; but Charley broke this bough off, so these babies will never come out of their pretty cradles, because they will die."

This made tender-hearted little May feel so badly that Grandma, who came into the room just then, told Charley to put the buds in a large glass jar full of water and stand them in a sunny window. He did so, and May woke up one morning to find that the baby leaves were babies no longer, but had broken out of their silken cradles some days before the babies out in the trees were able to do so.

That evening Grandpa was told all about the first botany lesson and at once became interested in that, as he was in everything the children did.

"Do you think I can find specimens enough to fill my herbarium?" asked Anna.

"Dear me, yes, child. Why, the woods will be full of flowers in a week or two. I suspect arbutus is out now."



OPENING BUDS

"Arbutus?" cried Anna joyfully. "Oh, Mamma, it was arbutus, wasn't it, that Grandpa sent you last spring? The flowers were all pink and white, and, oh, so fragrant! Don't you remember?"

"Yes, indeed. I was so glad to have it," answered Mamma, turning a grateful glance to Grandpa. "I remember how I used to pick it in the woods over there when I was a girl. It grew so thick on the hill then, and I don't think I've ever found a sweeter flower."

"It's just as thick now as then," said Grandpa; "I noticed that it was budding last week. Tell you what, Mother," he added, turning to Grandma, "you might get us up a lunch to-morrow, and I'll take these young folks over in the morning, if it's fine."

The children looked the thanks they did not speak, and

went to bed early that night to dream of the treasures they would find in the woods the next day.

But alas for their expectations! Anna awoke next morning to the sound of falling rain, and, going to the window, looked out upon a sky so leaden in hue as to prevent the hope of any clearing up for that day at least. Charley was not long in making the same discovery, and it was with a very disappointed look upon their faces that our two little friends entered the dining room for breakfast.

“Well, I declare,” said Grandpa, “clouds without and clouds within. Here,” passing a dish of rosy-cheeked apples, “these are brighter to look at than either of your faces on this day. Try your teeth on one of these, Mousie, and forget about the weather.”

Grandpa called Anna “Mousie” because of her quiet little ways.

## CHAPTER III.

### A RAINY MORNING'S WORK—ROOTS



IN spite of Grandpa's cheeriness, the children could not forget their disappointment very long, and when Mamma came into the sitting room an hour or two after breakfast, she found Anna and Charley gazing dismally out of the window, and Baby May sitting in a disconsolate little heap on Grandma's pretty rag carpet, saying to herself, "Grandpa's house isn't nice 'tall when ze bad rain tums."

"Well, my young naturalists," said Mamma, in her cheerful way, "I think we can find something for you to do. Don't you think that inasmuch as we cannot get the flowers to-day, it might be a good plan to learn what to do with them when we do get them? Anna, bring your botany, and we will have a class right here this morning. The flowers will keep, and you will appreciate them all the more for a little study about them beforehand.

"Now," she continued, as Anna returned and handed her



the book, "we will not divide this into lessons to be committed to memory, as I dare say would be done in school. Anna, I suppose, has read it all over, or will do so; but you, Charley, will understand it better by hearing it read and talked about. I will hold the book for reference, and we will try to fix in our minds a few points that will help us when we get our flowers. Now, first, Charley, can you tell me what botany is?"

"It is the book that teaches us about flowers," said Charley.

"Yes, but it is a little more than that. It is the study or science of plants, or, rather, of the entire vegetable world; and a great deal of this is not contained in any book, but is learned from studying the plants themselves. Anna, do all plants bear flowers?"

"I do not think so, Mamma."

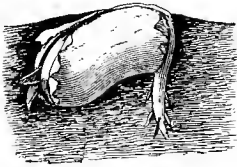
"No, that is one of the first things we have to learn. There are two kinds or two divisions, a higher and a lower form. You will probably not have anything to do with the lower form for some time yet, though it is well to keep it in mind. The plants that do not bear flowers and, therefore, do not start from seeds, are called in botany *cryptogams*, or *flowerless* plants. Ferns all belong to this division and so do



CRYPTOGAMOUS LEAF

all the pretty mosses of which you are so fond. Instead of bearing blossoms and fruit which contain seed, cryptogams continue their growth by means of spores, or fine atoms of dust, which, tiny as they are, contain in some form the means of reproduction. But, as these spores are so minute, it is more difficult to study cryptogams, so, excepting to indicate what the division includes, we will pass it over for the present.

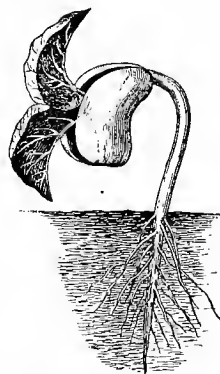
“The other kind, to which belong all the varieties of flowers, trees, and shrubs with which you are acquainted, are called *phanerogams*, or *flowering* plants, and this is the first division learned in analyzing. But there are so many different kinds of flowering plants, and the resemblance between them is so close, that the cleverest examination is necessary to distinguish them, and this examination is called *analyzing*.



BEAN, SHOWING BEGINNING  
OF GROWTH

“These plants all come from a seed, and there is a great deal to learn about the seed and how the tiny *embryo*, that is, the beginning of the plant, is stowed away in it. But because we are anxious to know something about the rudiments of analyzing, we will leave the seed and say nothing more about it, save that it contains the first stem or beginning of the plant, which is generally called the *radicle*. This has two leaves, which are different in shape from those that come afterwards, and between them lies the little head

from which the plant grows. These first leaves are called *cotyledons*, and this little stem in between them is sometimes spoken of as the *plumule*, though it is really the first of the terminal buds of which Anna spoke yesterday. In small seeds it is so tiny as to be invisible to the naked eye, but by looking at it through a glass, we shall be able to see it. A bean is a very good seed to look at, so I have brought some with me. Lend me your knife, Charley, and we will open this one."



BEAN, SHOWING FIRST  
LEAF AND ROOT  
GROWTHS



YOUNG PLANT,  
SHOWING  
COTYLEDONS,  
OR FIRST  
LEAVES

Charley did so, and Mamma cut the thick skin which served as a covering, and then the two leaves, which were each the shape of a half bean, were very plain; while between them was the little stem, or baby plant, which was very pretty when viewed under Anna's glass.

"Now," said Mamma, "as a plant grows, this little stem rises higher and higher, and other leaves begin to come, and then the first leaves, or cotyledons, drop off. You can see all this in a few days, when Grandpa's beans begin to grow. Those cotyledons are thick, you see. The reason for this is that they are filled with nourishment for the little plant, and after it absorbs all the nourishment so provided, it is strong enough, if it be a

healthy plant, to take its own nourishment from the earth by means of its roots, and from the air by means of its leaves.

“When we analyze, we must study first the stem, then the leaves, roots, and blossoms. Sometimes a plant is so well known or bears such unmistakable signs of its family in one of these parts, that we know what it is without a minute examination of them all. This is not thorough analysis, however, though sometimes it answers, especially if we are not able to get the whole plant.

“Now, about roots. It is sometimes said that stems spring from roots, but this is not correct. All roots spring from the embryo, which sends the root down into the ground and the stem up into the air, and other roots spring from the main root just as branches grow from the stem. These branches are called secondary roots, and in some plants they divide and subdivide until a fine network of small roots or rootlets is formed.

“If you take a slip or a cutting from some plants and put it in the ground, roots will start from the stem and a plant will soon grow. In a plant of this kind, we notice that these roots generally come from the *nodes*, that is, the places on the stem from which leaves start, and are merely a repetition underground of the leaves and branches of the plant above ground.”

“But all roots are not like that, Mamma,” said Anna.

“No, not all; and now we will look a little at the different divisions. First, we have *fibrous* roots, which are formed as

I have told you. These are the kind of roots most annuals have."

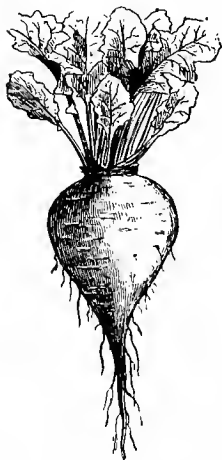
"What are annuals, Mamma?" asked Charley, to whom this long discourse on roots was becoming rather tiresome, though he was trying faithfully to understand it all.

"*Annuals* are the plants or flowers which complete their growth in one year. That is, they grow from seed in the spring, and die in the fall, after they have grown seed of their own. These plants have fibrous roots, and the fine branches they send out are called *rootlets*, and some of them are as fine as Baby May's hair. You will find that the small white



FIBROUS ROOT

violets have roots of this kind, while some of the larger varieties of violets have straight fibrous roots.



FLESHY ROOT

"Then we have *fleshy* roots. These are principally *biannuals*; that is, plants which take two years to complete their growth. Carrots, potatoes, and turnips belong to this order, as do also most varieties of lilies. In these the root, which is sometimes called a *tuber*, is raised the first year, and is planted the next spring to obtain the blossom. These fleshy roots

contain a large amount of nourishment, which is used for the plant the next spring. Now, there are a number of different kinds of fleshy roots, some of which are named according to their shape; for example, those which are conical, like the carrot, tapering from the crown, where it joins the stalk, down to a fine point; and those which are turnip-shaped, called *napiform*, that is, large and thick above, and then ending abruptly in a downward point as the turnip does. Others are shaped like the spindle which Grandma used to use on her spinning wheel. Between these which I have mentioned there are all kinds of variations.

“But I see Charley is tired of all this, and rightly, too, for it is a good deal for a little boy to remember. I believe if he goes down cellar he will find quite a number of the last kind of roots I have told you about, and perhaps, if they were washed very clean, Baby May might like them for playthings.”

## CHAPTER IV.

### STEMS AND LEAVES



THE next day was still rainy, but Mamma found means of continuing the botany lessons, and the little talk of the day before had been something to make the children forget the weather.

So after breakfast was over and the children began to wonder what they could find to do, she brought into the room several of Grandma's plants and said, "Well, shall we continue our botany lesson?"

"Yes, indeed, Mamma," said Anna; "but what are we to study now?"

"We will see about that. Charley, do you know what we talked about yesterday?"

"Oh, yes, Mamma, about roots."

"Very well. Now, to-day we will look at the other parts of a plant. Look at this geranium, Charley. What parts do you see?"

"The leaves and the flowers, Mamma."

"And what do the leaves and flowers grow from?"

"From the stem, do they not?"

“Quite right. Now the *stem* of the plant fills the same place as the axle of Grandpa’s wagon. It bears all the other parts. Roots, leaves, branches, and flowers all spring from the stem. Do all plants have the same kind of a stem, Anna?”

“I don’t think so, Mamma.”

“No, they do not. Look, for example, at the difference between the plants before you. The calla lily, you see, has a thick, fleshy stem, while that of the geranium is drier and more woody. These two plants will show you the varieties

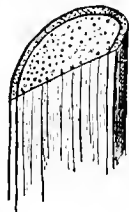


EXOGENOUS

of stems which form the first two divisions in flowering plants, as you will find when you begin to analyze. In the *exogenous* or *dicotyledonous* plants the wood fibres are in regular circles around a central pith. If we should cut

a piece of geranium and look at it under Anna’s glass, we should see that it belongs to that order.

“If we take a piece of the lily stalk, however, we shall see that the wood fibres are arranged irregularly through the stem, and do not form a circle. This, therefore, belongs to the *endogenous* or *monocotyledonous* division. These names are hard for you to remember; but when you have them properly fixed in your minds, you will be able to tell by a glance at the stem to which of the two great divisions of phanerogams a plant belongs.



ENDOGENOUS

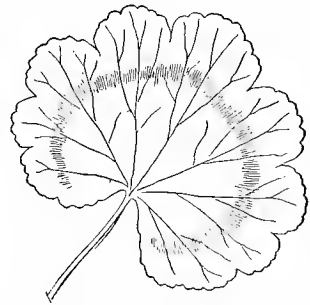


“ You will learn other properties of stems—their manner of growth and the time they last—from the different plants. So let us now take a look at leaves. What is the most important use of leaves to the plant, Anna?”

“ To take in air and light, I think, Mamma.”

“ Yes; leaves serve the same purpose in plants that lungs do in animals. Besides, these leaves are sometimes used for the storage of nourishment, as in the case of the cotyledons of which we learned yesterday, and the thickened leaves or scales which protect the buds, as you saw in those leaf buds we had the other day.

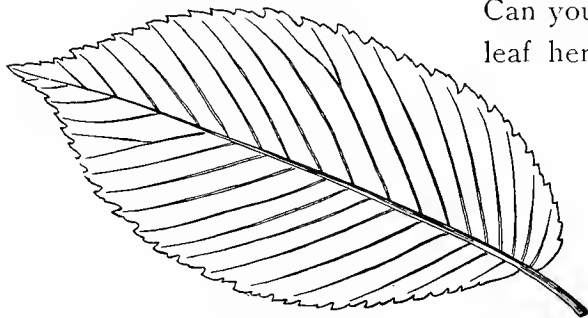
“ Leaves which do nothing else but take in light and air are sometimes spoken of as foliage, and it is of them we shall talk this morning. If we look at a leaf, we shall find that it usually consists of three parts—the *blade*, the *petiole* or footstalk, and the *stipules*. The blade is the most essential part. It is the green which we recognize as foliage. It is made of soft green pulp, braced and supported by fibres which make a frame, and are called the *ribs* or *veins* of a leaf. One of the first things we notice about a plant in analyzing it is whether its leaves are *net-veined* or *parallel-veined*. These points mark the division to which it belongs, just as the arrangement of the wood



NET-VEINED LEAF

fibres in its stem does. In the net-veined leaves the veins branch off from the main rib and divide and subdivide until a network is formed, too fine to be visible to the naked eye.

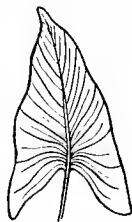
Can you find a net-veined leaf here, Charley?"



PENNI-VEINED LEAF

After a minute's hesitation Charley broke off the leaf of a scarlet geranium.

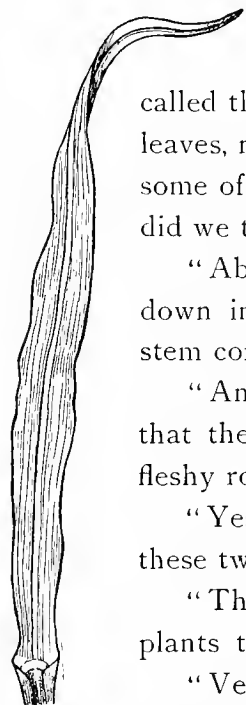
"Yes, that is right. Now, look at it, Charley, and see how the little veins run into each other, and what a fine network they form. You can see it best on the under side of the leaf. There are two kinds of net-veined leaves. First, when the veins all branch from the centre rib, sometimes called *penni-veined*, since the veins are arranged on the rib as on a feather, and *penna* is the Latin word for feather. The other kind are called *palmate*, *digitate*, or *radiate-veined*, and branch off toward all sides like little rays. The geranium leaf is radiate-veined."



CALLA LEAF

After the little folks had examined it thoroughly, Mamma continued, "Parallel veins are also of two kinds. The first is when the veins all start together at the base of the leaf and

run parallel to each other to its point. Corn and grass are examples of this kind of a leaf, and so are some lily leaves. The other is when the veins start at the midrib and run parallel to each other to its margin or edge. This calla lily,



CORN LEAF

you see, is an example of this second kind.

Linnæus, one of the oldest naturalists, called the parallel veins, nerves, and parallel-veined leaves, nerved leaves. And now we have gone over some of the most essential points. Charley, what did we talk about yesterday?"

"About the roots, Mamma, and how they go down into the ground out of the seed when the stem comes up."

"And how they divide," added Anna; "and that there are two divisions of them, fibrous and fleshy roots."

"Yes, and there are several grades between these two. Well, what comes next?"

"The stem," said Charley, "and that holds the plants together like the axle of Grandpa's wagon."

"Very good," said Mamma, "and to-day we are studying leaves. We have had their divisions by veins. We will not spend much time on their shape, because we shall learn that best as we study the plants, and we know the variety is almost endless. But I want you to look closely at this leaf. These little appendages at the base of the foot-

stalk, that is, where it joins the branch, are called *stipules*, and you will find something answering to these on almost all kinds of leaves. And now I think we have had lesson enough for this morning. To-morrow, perhaps, we shall have some flowers to examine, and, if we do, what we have already learned will be of use to us."

Grandma came in then to say that if the children would like to pop corn, the kitchen fire was just right for it, so the little scientists forgot their studies for a while.

## CHAPTER V.

### PARTS OF FLOWER—ARBUTUS

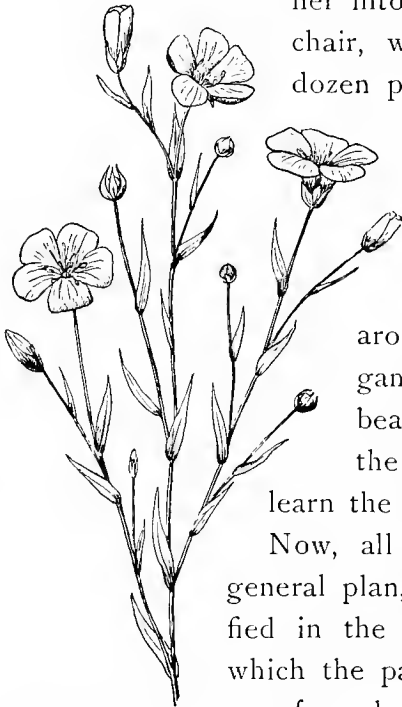


THE next morning was still rainy, but our little folks were not so much cast down by it as on the day previous; and when Anna went into the sitting room after breakfast and found a bunch of arbutus, gathered by the hired man the day before, in a glass on the table, she felt that for the present she needed nothing to complete her happiness. She could hardly wait until Charley and May returned from the barn, where they had gone with Grandpa to watch the calves—or “baby tows,” as May called them—take their breakfast of buckwheat gruel and hay tea.

“Well,” said Mamma, smilingly, coming into the room while Charley and May were admiring the arbutus, “our botany class seems all ready for work early this morning, and we have a specimen too, and a very pretty one. Now we must hurry and get through with our lesson, so that we shall have time to examine it carefully. Anna, bring the botany, and you may bring the glass too, for we shall have use for it later. Come, Charley, leave the flowers now. You’ll have a chance to look at them again soon.”

“Tan May have a yesson too?” asked Baby, feeling half afraid she might not have a part in what Anna and Charley enjoyed so much.

“Yes, Baby May, sit down by sister,” said Anna, drawing her into the big old-fashioned rocking-chair, which would have held half a dozen people of their size. “And she must be very quiet and not interrupt Mamma when she is telling us about the pretty flowers.”



FLAX BLOSSOMS

Mamma looked smilingly around at the little group and began, “I think we all know the beauty which the flower gives to the plant, and we shall be glad to learn the parts of the flowers themselves. Now, all flowers are formed after one general plan, which is, however, much modified in the different varieties, in some of which the parts are so run into each other, or of such peculiar forms, that they can scarcely be recognized at a first glance. We shall hardly find a plant which contains each part in the simple and perfect form, but for study we ought to get a plant that does this as nearly as possible. I see the author

of Anna's botany has taken Flax as a pattern plant; this is very good, and we will do the same, because Grandma happens to have some flax blooming in a box in the kitchen.

"Flowers are said to be perfect when they have a complete *perianth*; that is, both a *calyx* and a *corolla*. Charley may go out to the kitchen and get two or three flax blossoms, and we will see by one of them what these words mean."

Charley soon returned, and Mamma continued:

"The *calyx* is the little green circle below the flower. See, in flax it is just like a little cup holding the flower. When it is made up of several parts or pieces, these are called *sepals*. The *corolla* is the part that comes next to the calyx. It is generally colored. In flax it is the blue part which you recognize as the flower. When the corolla is made up of different parts or divisions, they are called *petals*. Now, can you remember the difference between the two?"

"I can," answered Charley.

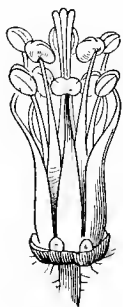
"And I know Anna can, for she, no doubt, knew it before. The calyx and the corolla taken together are called the *perianth*. Now, Charley, look at the flower and tell me what you see in it besides the calyx and the corolla."



CALYX AND COROLLA OF  
THE MORNING GLORY

“The centre, Mamma.”

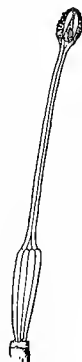
“Yes, that is all it is to you now; but as the centre contains the little seeds, you can see how important it is. We must know its different parts, which are the *stamens* and the *pistils*. In some flowers, the flax for example, we say the *ovary* also; but the ovary is properly only a part of, or the base of, the pistil. The stamens consist of two parts—the *filament*, or stalk, and the *anther*, which is the useful part. This is a little case with two or



STAMENS AND  
PISTILS

more perforated cells through which is discharged a sort of powder, usually yellow or red, which is called *pollen*. Anna, do you remember how Charley gave you a tiger lily last summer, telling you to smell it, and when you did so, it left brown powdery marks on your nose? Well, those marks were made of pollen which you rubbed from the anthers as you touched them. This pollen is very valuable to the plant. It is the food for the baby seeds in the ovary.

“The pistil, when complete, may be said to contain three parts—the *stigma*, the *style*, and the *ovary*. In many plants, however, there is only one ovary, which is common to all the pistils and to which they are all joined. Such a flower is the flax, but it can hardly be called complete. The style is the stem of the pistil, and



A PISTIL



the stigma is on the top of this. Sometimes the stigma is shaped like a little knob or ball, and sometimes it is only the point of a style; but whatever its shape, it is always moist, and it catches and absorbs the pollen which falls from the anthers, and sends it down through the style into the ovary, to feed the baby seeds. Now, we have all the parts, unless, indeed, we include the *torus*, or receptacle, which is simply the end of the stalk upon which the flower organs grow. But in order that you may understand it all better, we will look at a flax blossom through Anna's glass."

"Oh, Mamma, don't tear ze f'ower," exclaimed Baby May reproachfully, as Mamma opened a flower so they could see.

"Just this one, dear, or else you wouldn't be able to understand about it. Mamma is glad Baby is so fond of the pretty flowers; it is very wrong to tear them up for nothing, but we must do so sometimes when we study about them."

She had cut it lengthwise through the calyx and corolla, and when she put it under the glass, they could see plainly the stamens with their anthers, the moist stigmas of the pistils, and even the beginning of the tiny seed in the ovary.

When they had all seen these, Mamma continued:

"I have told you now about all the parts of a flower. A flower is *perfect* when it has both pistils and stamens, *complete* when it has both calyx and corolla. It is *regular* when all the parts of each set are alike in size and shape, and *symmetrical* when there is an equal number of parts in each set or circle of

organs. The flax is complete, because it has both calyx and corolla. It is regular and symmetrical, having five parts in each set; but yet it is not quite perfect, because the pistils are not complete. Instead of having five tiny ovaries, one in the base of each pistil, the ovary is all in one; but, as I told you before, we can hardly find a plant without some irregularity of this sort. We will have just one point more, and then take up the arbutus, towards which Anna is casting such longing eyes.

“There is always a certain number that seems to be running through the flower, or, at least, to be recognized in some of its parts. It is oftenest five, three, or four, but occasionally two. Whatever the ground number may be, it runs through the whole flower in symmetrical blossoms. The ground number is the first circle of the flower. In symmetrical flowers, also, the circles are alternate; that is, the petals stand over the intervals between the sepals; and the stamens, when of the same number, stand over the intervals between the petals; or when there are a double number of stamens, the first circle does this, and the inner circle alternates with the first, as do the pistils with the second. This is proof that flowers are altered branches. The parts come in whorls, and are, therefore, only altered leaves.”

“What is a whorl, Mamma?” asked Anna, who, as usual, was listening with closest attention, as indeed were the other children.

“A *whorl* is a circle of leaves; that is, the number of

leaves you would pass with a string or line if you drew it from one leaf to the next higher on the same perpendicular as the first. Thus, for example, when a whorl has three leaves, the leaves, if they all grew at the same height on the stem, would be one-third the circumference of the stem apart. I hope you now have a general idea of the plan of a phanerogamous plant in your minds, and we shall go into the details as we study from the plants themselves. Charley, can you tell me whether *Arbutus* is a cryptogamous or a phanerogamous plant?"

"It is phanerogamous, Mamma, because it has a blossom."

"Quite right. This is the flower that Anna and I so much admire. Now, let us look at the stem."

She took a piece off, and, putting it under a glass, asked Charley whether the wood was in regular circles round a central pith, or in fibres.

"In circles, I think, Mamma."

"Then you're not sure? Well, we must be sure if possible. Anna, can you tell?"

"Oh, yes, Mamma, in circles. I can see the pith quite plainly."

"Then we have gained one point. The wood is in circles. Now, what about the leaves?"

"They are net-veined."

"Well, then, we'll look at the flower. First, taking one away from the little bunch, we find that inside the two little

involucres, as the leaves at the base of the flower may be called, it has a regular calyx of light green, and contains, in a modified form, five sepals. They are united, as are the petals of the corolla, which also number five. The corolla, you see, is somewhat trumpet-shaped, with the top cut or cleft into five



ARBUTUS

divisions. Much as Baby May dislikes to have us cut the flowers, I am afraid we shall have to do so this time. Now, Anna, look very closely and tell me what you see."

A flower was placed under the magnifying glass, and after a minute Anna said, "I can see the ovary, Mamma, and it is in five divisions, but it has only one pistil. It has ten stamens, and the anthers seem to send the pollen directly into the ovaries, which have little holes on top. The pistil is long and seems to come from the centre of the group of ovaries."

"Very good indeed. With such a fund of information, we ought to have no trouble in finding out what it is."

“Why, Mamma, we know what it is already,” said Charley.

“Are you quite sure?”

“Yes, for Grandpa said it was arbutus, and he knows.” Charley’s faith in Grandpa never admitted of doubt.

“Grandpa is right, of course; but I am showing you how to trace it from the beginning, so that you could find out what it was just as if you had not heard before. We know that it is phanerogamous, and by the leaves or stems we found it was exogenous. Phanerogamous plants are divided into two classes—exogenous, having net-veined leaves and the wood in circles; and endogenous, having the wood in fibres through the stems and parallel-veined leaves. The flower, too, in exogens is generally in threes and fives. *Arbutus* has its parts in sets of fives. There are a number of divisions of exogens, and we place this in the third because the petals of the corolla are somewhat united. This is called the monopetalous division. There are two divisions of this. The first has the ovary inferior to the calyx; that is, the calyx is above or over the ovary. This flower does not belong to that class, but passing to class B in this division, we find the ovary superior, and the first family given in this class is the Heath family. It has five or ten stamens and a five-celled ovary, with the anthers opening into the apex of each cell. Anna, turn to the Heath family and look for *Trailing Arbutus*.”

In a few minutes Anna found it, and the description so exactly suited their flower that they at once knew that their first analysis had been a success. I wonder how many of our little people will remember if I tell them that the scientific name of this plant is *Epigera repens*!

## CHAPTER VI.

SAXIFRAGE—BLOODROOT—PARTRIDGE BERRY

THE next morning dawned bright and clear, and the sunshine had a summer-like warmth that almost made one forget how cold the air was in the shade.

To the children's great delight, after Grandpa came in from the barn work, he said to Grandma: "Well, mother, if you've got some cookies and gingerbread put away for us, I guess we'll have use for them to-day, for we're going out to the woods."

"You must wear your rubbers, Anna, and your warmest clothes," said Mamma; "and, Charley, you wear your boots and overcoat. It is too early to go picnicking in the same clothes you would wear in June. The woods will be very damp, despite the warm sunshine."

The little Burtons were brought up to be obedient, so they made no objection to what to them seemed useless precautions. An hour later a merry party set out for the wooded hillside, nearly a mile away. Each of the children carried an empty basket for specimens, and Grandpa had a larger one filled with luncheon. They were to be back in time for the one o'clock dinner; but, as Grandpa said, "There's

something in the very air of the woods that makes you feel like eating," and his basket was emptied without any difficulty, and filled with mosses and ferns for the return home.

Arbutus was there, sure enough, and Anna gathered enough to fill several boxes to send to friends in town; but that, sweet as it was, was hardly more admired than the many other plants and flowers which seemed to have been brought out by the rain.

The children filled their baskets, taking all the roots they could, and, as a result, had plenty of flowers for the next few days' examination.

The afternoon was spent in sorting them over and packing them in the cellar to keep until they were wanted. The next morning Mamma had several plants arranged on a tray for their lesson.

"Which shall we take first?" she asked.

"This one, please," answered Anna, selecting a plant with a bunch of tiny white flowers at the head of a rather hairy stem which grew up from a bunch of leaves resting on the ground, and a tangled mass of fine, fibrous roots.

"Very well. That will do nicely. Charley, you may look at it first and tell me all you can about it."

"It is a phanerogamous plant, and I think belongs to the exogenous class. The leaves are net-veined, and the stem seems to be in circles round a centre pith."



“Quite right. You are learning to observe nicely. Now, Anna, look carefully at a flower and tell me what you can see first without cutting.”

“It has both calyx and corolla, and the corolla is of separate petals. The calyx is cup-shaped and composed of five sepals which are not quite separate. It has ten stamens.”

“Then it has a complete perianth, or set of floral envelopes; and, as the petals are wholly separate, we know that it belongs to the polypetalous division of exogens. Turning to that division, we find that it has ten stamens, just twice the number of sepals, and that it belongs to class B of this division. Are the leaves alternate or opposite?”

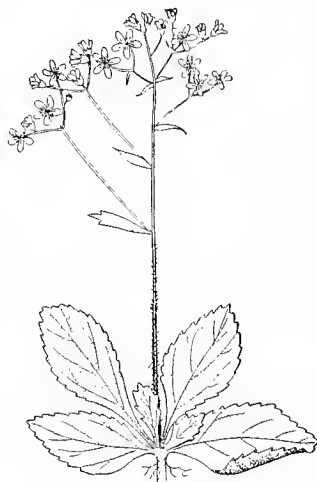
“Alternate, Mamma.”

“Yes; and now, Anna, cut the flower and look at it through the glass and tell us what you see.”

Anna did so, and said:

“The ovary is two-celled and contains a large number of little round seeds. The stamens seem to grow right out of the calyx.”

“Well, look at a bud and notice how the leaves are folded in it.”



EARLY SAXIFRAGE

“They lap over each other.”

“Yes, I thought so. They are what we call *inebricated* in the bud. As the stamens seem to come from the calyx, and the leaves are opposite, I think it belongs to the Saxifrage family, which is very large indeed, and contains a great variety of plants. These flowers are in a *panicle*; that is, a bunch at the top of a stem. The stamens are ten in number, and the flowers are inebricated in the bud, so there is no doubt about its being the Early Saxifrage in the Saxifrage family. Do you think you understand how to analyze now?”



BLOODROOT

“Yes, Mamma, I think we do.”

“Very well, then, Anna, you and Charley take that waxy white flower with the red root and see if you can find out what it is.”

The children went to work patiently, and after a while Anna announced that they had found it in the Poppy family, that its true name was *Sanguinaria Canadensis*, and its common name, Bloodroot.

“That is right,” answered Mamma. “You have done very well indeed. It is called bloodroot because the root contains a large quantity of red juice. Notice how it has

stained your hands. Bloodroot is a valuable medicine. It is frequently combined with whiskey, and an excellent liniment is made in this way."

"Yes," said Grandma, "I remember one year that old Mr. Turner was laid up for months with rheumatism. An old Indian woman who used to come around here told him about bloodroot, and it cured him in a few days."

"It is well always to keep in mind the plants that have medicinal properties," said Mamma. "If, for example, Charley should ever have a chance, which he used to wish for so much, to play Robinson Crusoe, he might find knowledge of this kind of service to him. Well, we have left these two plants bearing red berries. We can't get the blossoms now. You are tired, I dare say, of analyzing, so we will get rid of these in a very irregular way. Grandma, what are they called around here?"

"That one with the smallest leaves and the two-eyed berry is Partridge Berry, and the other is the Wintergreen."

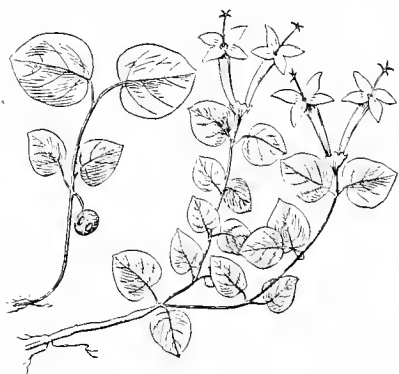
"Now, Charley, turn to the index and see if you can find both of those words. If so, see what family the plants belong to and what their true names are."



WINTERGREEN

“The wintergreen belongs to the Heath family,” Charley answered, after a few minutes. “Its name is *Gaultheria procumbens*,” stumbling a little over the long words. “It was named in honor of Doctor Gaulthier of Quebec. Oil of wintergreen is made from the leaves, and it has astringent properties. What does that mean, Mamma?”

“It means binding or contracting. So you see it might be used for medicine. It has some mucilaginous properties also. Well, what about the other?”



PARTRIDGE BERRY

Anna came to his assistance now, and in a few minutes they announced that the partridge berry was properly known as *Mitchella repens*, the first part of the name being in honor of Dr. Mitchell,

who was a co-worker with Linnæus.

“So both these plants are useful,” said Mamma, “and I dare say if you give the berries to Baby May, she will soon find a use for them.”

And I think if any of the boys and girls who read this, who are not acquainted with the berries, could see them once, they too would soon find a use for them.

## *Bureau Nature Study.*

CORNELL UNIVERSITY.

*Ithaca, N. Y.*

### CHAPTER VII.

GOLD THREAD—DOGTOOTH VIOLET—LEAVES

“WE are going to look at this tiny little white flower this morning,” said Mamma, when they were gathered in the sitting room after one of Grandma’s hearty breakfasts. “Isn’t it a dainty little thing? Look at it, Charley, and tell all you can about it.”

“Its leaves are net-veined, so it belongs to the first division, Mamma.”

“Yes, it is exogenous. You may think at first that it has no calyx, but that is a mistake. Its calyx is white, the same color as the corolla. As the flower is very tiny, we must examine it entirely under a glass; but we know, to start with, that it has a complete perianth composed of a calyx and corolla, each of which is composed of five petals. With the help of the glass, you can see that it has four pistils and a large number of stamens, which, as you get to know flowers better, you will understand is one of the characteristics of the Crowfoot family. This is a very large family, and composed almost entirely of small plants. There are about twenty classes of this family, among them being several varieties of buttercups, which we will study later. But there is a divi-

sion among them called *Coptis*, or Gold Thread, to which I think we shall find this little plant belongs. If you notice these long, bright, yellow fibres among the roots, you will



GOLD THREAD

understand why it has the latter name. Botanists would call this *Coptis trifolia*, because the leaves are cleft, or divided, into three parts."

"Aren't the leaves pretty?" said Anna. "Why are some of the roots yellow and others brown?"

"I cannot tell you, unless it is that the younger roots have not yet been able to throw off the color of mother earth. The leaves are evergreen; that is, are green all winter. This plant has valuable medicinal properties, too."

"Are all flowers good for medicine, Mamma?" asked Charley, who was ambitious to become a doctor.

"I suppose they are, only we do not know them all. Arbutus, partridge berry, wintergreen, bloodroot, and gold thread, which, excepting saxifrage, are all we have had so far, are all used for medicines. And now we have a plant here which, so far as I know, has never been found useful as medicine; but I think we shall like to know what it is." She held up what looked like a small yellow lily, with long, slender, curiously mottled leaves.

“That belongs to the Lily family,” said Anna, “because the flower looks like a lily, and the leaves also.”

“To which of the two divisions of flowering plants, or phanerogams, does the Lily family belong, then?”

“To the second, Mamma, because the leaves are parallel-veined and the wood in the stem is in irregular fibres and not around a central pith.”

“Very good indeed. Charley, can you tell me the name of this second division? The other flowers we have had, you know, all belong to the first, which is called exogenous.”

“Is it endogenous, Mamma?”

“Yes, that is right; you are progressing finely. And now, since we know the family of this flower, we will go a little farther. The Lily family is a very large one, and includes many plants which you would not at first recognize as belonging to that family. But this is so like a lily that we may feel quite sure it is included in the class known as the lily proper. Its characteristics are that the perianth, which includes the calyx and corolla, is of the same color, and usually consists of six parts; that is, two sets of three each, which stand for sepals and petals. It has the same number of stamens, and usually the ovary contains two cells. Let us look at this one.”

The blossom was cut lengthwise, and under Anna's glass the two cells could be easily seen. They each contained an irregularly shaped little seed formation.

This being settled, Mamma continued: "This plant is a biennial, which means that it takes two years to complete its growth. A seed planted the first year would produce the little tuber, or bulb, you see attached to the stem; for most lilies, you know, grow from tuberous or fleshy roots, and the second year the tuber produces the seed-bearing flower.



DOGTOOTH VIOLET

Knowing all this, we have no difficulty in placing this flower in the variety called *Erythronium*, or Dogtooth Violet. It is also called Adder's Tongue, from the spotted leaves. While it grows wild in swampy places, I think it would make a handsome plant for cultivation."

"Couldn't it be cultivated, Mamma?"

"I do not know. There is a variety called *Erythronium Dens-leonis*, which is very similar, save that it is much larger. That is a native of Europe, and I have seen it in greenhouses; but this one, which is designated *Erythronium Americanum*, is, so far as I know, never seen save in its wild condition."

"Now I should like to have you look a little at these leaves. Anna, what kind of leaves has the gold thread?"

"Compound, Mamma; they are in three parts."



“Yes, and the divisions are what is called wedge-shaped. What about the leaves of the dogtooth violet?”

“They are simple in form, and slender and pointed in shape.”

“Yes; they are what are called *lanceolate*, or lance-shaped. Notice the edges of both. The gold-thread leaf, you see, has a notched edge, and the notches point forward like the teeth of a saw; so it is what we call a *serrate*, or saw-toothed edge.”

“The edges of the dogtooth violet are plain and smooth,” said Anna.

“Yes; we call them *entire*. And the leaf has a tapering point, so we call it *acuminate*, or tapering at the end. If it were not tapering, but a short, sharp point, it would be called *acute*. If you had taken botany up in a regular class at school, you would have learned all this, and much more, when you were studying about leaves; but I think you will find it just as easy to observe the peculiarities of the leaves of each plant as you study it. The arbutus leaves, if you remember, are mostly oblong, nearly twice as long as they are wide, while those of the wintergreen are very slightly serrate. The pigeon berry has almost perfectly round leaves with an entire edge.”

## CHAPTER VIII.

### PREPARING SPECIMENS—ANEMONE—LIVERWORT



FEW days later, Grandpa, acting no doubt upon a hint from Mamma, presented Anna and Charley with a pair of press boards for preserving their specimens. They were only pine boards about twelve by eighteen inches in size, but they were planed so smoothly that there was a sort of polish on their surface.

Eager to put them to use at once, Anna suggested that they go directly to the woods to see what flowers could be found, and Mamma's consent having been obtained, she and Charley set forth.

About the middle of the afternoon they returned, bringing baskets well laden with floral treasures, which included specimens of all the flowers they had had, as well as several new ones. The evening was spent in cutting a pile of old newspapers into sheets the exact size of the boards, and, large as the supply seemed, they found it necessary to renew it frequently before their botanical enthusiasm was satisfied.

The next morning, as soon as the kitchen table was

cleared, they began to clean the specimens under Mamma's direction and put them to press. This is the most important part of the work of preparing an herbarium, and it requires care and patience, both of which Anna possessed to a rather unusual degree ; but Charley, like some other boys, had little of either. Knowing the value of the roots, they had been careful to secure the plants with the roots entire, and in some cases had brought them home without disturbing the earth around them. This is a little trying for the finger nails, but it is an excellent precaution if the roots are fragile or easily broken, and it is particularly good if the specimens are not to be cleaned immediately, as the plant is thereby kept in its freshest condition. Faded flowers do not make good specimens.

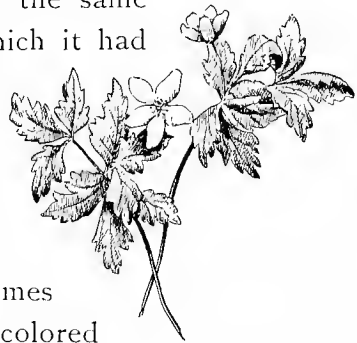
The first thing they did was to remove all the earth, first using their fingers, and afterwards a small brush which Mamma provided. Then the roots were washed in several waters, care being taken not to wet the flowers or leaves unless the latter seemed absolutely to require it. They were dried carefully with soft old rags, and each one was laid on a separate piece of paper, great pains being taken that, in the case of the gold thread, the yellow fibre which gives the plant its name was plainly discernible among the fine brown rootlets. Mamma herself prepared several tuberous plants by carefully splitting the tubers, removing most of the contents, and filling the cavity with cotton. This tended to prevent decay and also shortened their drying process.

After the plants had been arranged, the sheets of paper were carefully laid one on top of the other and placed between the two boards. These must be put under heavy weights, and Grandpa, to whom nothing which pleased the children was any trouble, had his hired man cut two square stones, each of which required the united strength of the children to lift it and place it on top of the boards. Then Mamma explained to them how the specimens should be looked at each morning and evening, and the damp papers changed for dry ones. At first, the papers taken away were dried and used again; but after several usings they became so saturated with plant juice that when dried they were stiff and starchy, and, consequently, did not absorb well. If the papers are used too often, the specimens will not keep their color and are very likely to turn black.

Blotting paper is best for this purpose, because it absorbs moisture; but as none of that was at hand, newspapers made a good substitute. A hint from Mamma to Papa a few days later brought a good supply of blotting paper, which Anna used for the more delicate flowers, as it preserved their color better than the other.

All this took up so much time that it was not until the next morning that the children found an opportunity to look at the new plants they had brought home. Two of these Mamma decided to analyze, and this was accomplished without any difficulty.

The first was a very fragile little flower of a delicate pink hue, and some of the same variety were also found in pure white. The calyx was the same color as the corolla of the gold thread, and a little below the flower was a cluster of delicate green leaves on very fragile stems. It had small, tuberous roots resembling tiny sweet potatoes in appearance, and a few hairlike fibres were attached to them. After examining the stems, the leaves, the number of pistils, and the roots, Charley and Anna agreed in placing it in the same family as the gold thread, with which it had many points of resemblance, and after a little study of the plants in the Crowfoot family, it proved to be an Anemone, or Windflower.



ANEMONE

“These flowers are a little irregular,” said Mamma. “Sometimes you will find both white and colored flowers upon the same plant, and sometimes, but not frequently, there will be several flowers of different colors and sizes above the same involucre, as the little circle of leaves below the flower is called. In fact, it is difficult to find any two plants which do not differ in regard to the size and shade of the flowers, although it is easy to distinguish all the family traits in each.”

The other plant had down upon the stems and leaves, which were old and leathery looking. The flowers were light blue

or purple, and close to them were two pointed little leaves resembling mouse ears in appearance, which might, at first, be taken for the calyx, though they are not in any way a part of the flower.

“These leaves are the involucre,” said Mamma. “This flower, like the anemone and gold thread, has its calyx of the same color as the corolla, or perhaps it would be better to speak of them all as having a colored perianth.”



LIVERWORT

“And this belongs to the Crow-foot family too, does it not, Mamma?” asked Anna, who was rapidly learning to note the distinguishing traits of the plants she studied.

“Yes, that is quite right.”

“But the leaves are so different looking,” said Charley. “See, some of them look old and withered.”

“Yes; these are last year’s leaves. Like the arbutus, you see, their leaves keep green during the winter, and the new leaves do not come until after the flowers are past. These odd-looking little downy buds, all crumpled up into funny little rolls, are really the new leaves, which will open later, but scarcely before the flowers are faded.

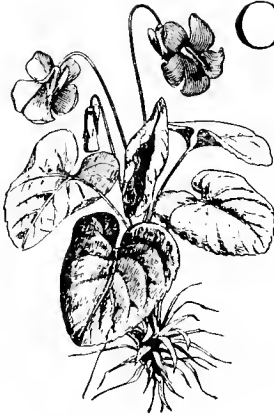
“You see this flower has six petals and a number of pistils. You will notice one peculiarity about the plant is that it has no main stem, but that each single flower and leaf comes on a separate stem or *scapē*, which is hairy or downy looking. We know it belongs to the Crowfoot family, and so, from its peculiarly shaped leaves, we trace it up to the class known as hepatica, or liverwort, so-called from the shape of the leaf. This specimen is *Hepatica triloba*, because the leaves are divided into three parts. The other variety generally has five-lobed leaves.”

“Shall we get any of that?” asked Anna.

“No; I think that grows rather too far north. Now, let us show Baby May the funny little baby leaves rolled up here, and then I think our lesson will be ended for this time.”

## CHAPTER IX.

### VIOLETS



ONE day Charley came in with both hands full of violets. “Just look at them, Mamma,” he said; “I found them down in the meadow. See, they are yellow and purple and white. Aren’t they lovely? Can’t we analyze all of them? Come, Anna, let us clean them right away.”

Anna was nothing loth, and a few minutes later found them out on a big rock back of the kitchen, with a pan of water between them, and a brush and cloth to help them in their work of cleansing. Charley washed and Anna dried them, and soon they carried in quite a trayful for Mamma’s help in examination.

“It won’t be hard to find out what they are, will it, Mamma? They all belong to the same family, and we know it without looking, don’t we?”

“Yes, we know they belong to the Violet family; but still we may have some difficulty in classifying them in their proper



species, for the Violet family has a number of members, and they all bear a close resemblance to one another. The violet is considered irregular in corolla, because one of its petals is different in shape from the rest ; but yet it is complete, regular, and symmetrical, because it has both calyx and corolla, and five sepals, five stamens, and five petals. The lower petal, you see, has a sort of a sack at the base, called in botany a *spur*. It is much larger on some violets than others. The stamens are short, and their filaments or stems are broad and flat. They grow more or less fast to the pistil and completely cover it save for one style. The ovary, as you will see if you examine it under a glass, is one-celled and contains a number of seeds.

“Let us look at the largest of the plants first. See how long the stems of the leaves and flowers are ; and, save for an occasional graceful curve or bend, they grow perfectly erect or straight, instead of lying flat on the ground. Charley, can you tell me what shape these leaves are ?”

“Heart-shaped, I think, Mamma.”

“Yes, they are almost perfectly heart-shaped. These flowers are dark blue or purple. I think we will venture to put this in the herbarium as the *Viola cucullata*, or common blue violet.”

“Here is another dark blue one,” said Anna. “The leaves are hairy, and not at all heart-shaped. They are more nearly arrow-shaped, though not quite sharp enough for that.”

“Nevertheless, I think we must call that the arrow-leaved

violet, or *Viola sagittata*. These leaves are nearest what are called halberd-shaped, so called because they resemble in shape the halberd, or battle-axe, of 'ye olden time.'"

"And those little white ones—what are they?"

"Just the common sweet white violet; *Viola blanda* is their botanical name."

"Let May look at them," said Charley. "They look just like little faces."

"'Es, 'et May see," said Baby, who was always ready to look at flowers.

"Well, look, darling," said Anna. "Don't they have pretty faces? I think violets must be captive fairies who are fastened to one place so they can't get away. See how they keep their little heads down. It must be that they feel sad because they can't be free, or, at least, we can believe that about them."

"Tan't zey ever be free any more?" asked May pityingly, for she always took fairy stories literally, and her tender baby heart was full of sympathy for even imaginary sorrows.

"No, the flowers themselves can never be free," said Mamma, who always encouraged her little people in their pretty fancies. "But they can raise seeds in which are baby plants, and when these little seeds are ripe, a big wind will come along and free them from the plant on which they grew, and blow them far away. Then they will fall into the ground, and next year will grow into other flowers with real faces."

"And now, Mamma, look at the big yellow one," said

Charley. "See, it grows up between two big hairy leaves, and the leaves are heart-shaped too, but they curl up so that we can't see their shapes unless we unroll them."

"Yes, I see," answered Mamma. "That is the *Viola pubescens*, or downy yellow violet. *Pubes* means down-like hairs, and the name comes from that. Did you get this in the meadow too?"

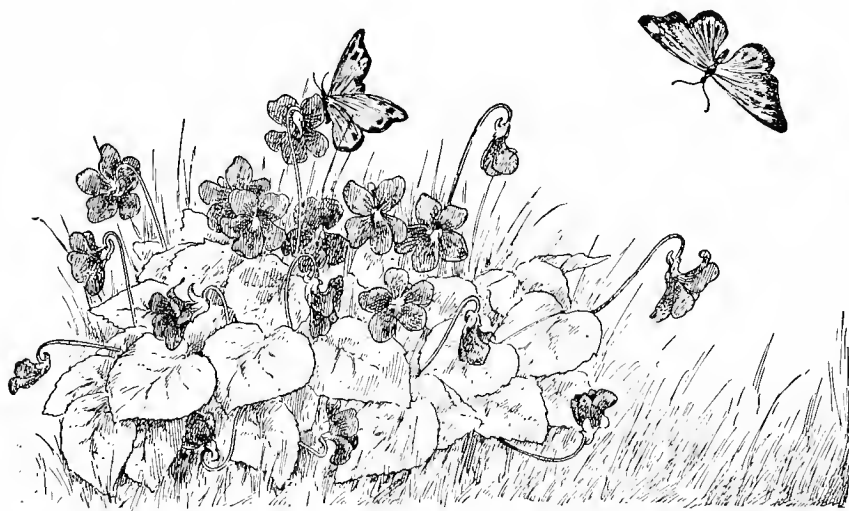
"Yes, Mamma, but not in the same place as the others. It was down by the brook."

"I thought so. These yellow violets usually grow in moist places, but are sometimes found in the woods."

"What are these light blue ones with heart-shaped leaves?"

"Oh, that belongs to the same family as the first we looked at, the *Viola cucullata*. We shall find, as I told you, a good many shades, and I have seen white instead of yellow flowers on the *Viola pubescens* plant frequently; but I think it belongs to the same class as if the blossoms were yellow. Now, I want you to look at the roots a little. All of these have fibrous roots. I think there is only one violet with a thick, tuberous root, and that is the *Viola pedata*. It has a peculiarly shaped leaf, and is called *pedata* from its resemblance to a bird's foot. You have none of those, I see, but you will get them. The roots of the *Viola cucullata* are smooth and white, with round-like stems. They are fibrous, of course, but still they have a regular shape, and differ decidedly in appearance from the roots of the *Viola blanda*, or white violet, which are

all tangled up like little bunches of hair. These are the two different classes of fibrous roots, and there are all sorts of modifications between them. And now I think you will have just about time to put these nice specimens to press before Grandma calls us to dinner."



## CHAPTER X.

### DANDELIONS—IMMORTElLES—SPRING BEAUTY



ONE pleasant day, when the children had made a pilgrimage to the woods in search of some new specimens for their collection of floral treasures, they brought in a quantity of dandelions and everlasting, or, as Mamma called it, immortelle, and with them several fragile little pink flowers which they had found in the meadow at the edge of the wood. These were so delicate that they seemed partially faded by their short journey, though they had been handled by Anna with unusual care. The flowers grew on a slender stem from between two lanceolate-shaped leaves in a manner similar to the lilies-of-the-valley, and were a light pink in color, veined with five lines of dark red or purple. The two leaves, which seemed to be all the plant produced, were rather thick for so delicate a flower, and contained a great deal of juice.

Mamma was as much interested as the children, for to her also the flower was a new one.

“Let us analyze it very carefully,” she said. “This is really the first one we have had of which we did not know something to begin with.”

A close examination showed that each little flower had a calyx composed of but two sepals, that its five stamens were each attached to the base of a petal, and that its ovary contained but one cell. This, with its succulent or juicy leaves, made them trace it to the Purslane family, which contained only four divisions, the last of which, called *Claytonia*, seemed to fit the new flower. Its name was given it in honor of John Clayton, an early Virginian botanist, and the children proved the specimen to be a *Claytonia Virginica*. Its common name is spring beauty; and though found in Pennsylvania, it is more frequent along the northern boundaries of Virginia and Maryland.

Having settled this, they turned their attention to the other flowers before them.

“Oh, Mamma,” said Charley, “when we were gathering them, a little girl from the little black house across the road from the meadow came down and stood at the fence and watched us, and she made fun of our flowers—that is, of the Dandelions—and said they were nasty weeds.”

“Yes, Mamma, these pretty soft yellow flowers,” added Anna, indignantly. “To think of any one calling them weeds!”

“I am afraid you will find a good many people out here who will do the same thing,” said Mamma. “They have an unpleasant odor, and are so common it is no wonder people do not appreciate them. Grandpa will tell you what wonderful things they are to spread and cause trouble in both garden and farm. The flowers are pretty, though, and seem doubly so to you because you have not had them under your feet all your lives. Let us look at one through your glass, Anna. Get the focus right, so you can see it plainly. You will find that, instead of being just a single blossom, each flower is a bunch composed of nearly a thousand, and the green that surrounds them is the involucre which belongs to all these flowers in common. Each little flower contains a separate seed. After the flower has blossomed, the involucre closes over it again until the seed is ripe, and when it opens again, it looks like a soft white ball, for every little seed has a silky stem attached, bearing several downy hairs. These seeds are very light indeed, and the wind blows them in every direction; consequently the dandelions spring up in such numbers everywhere that I do not wonder people in the country find them a nuisance.”



DANDELION

"I don't see how they can," said Anna, "when they are so pretty."

"Men who are busy have no time to stop and admire them, even if they saw their beauty, which is not probable. Farmers grow so intent upon raising their crops, which are useful, that they are apt to look with disfavor upon anything that interferes with that."



DANDELION WITH RIPENED  
SEED

"How long does it take the seed to ripen, Mamma?" asked Charley.

"Oh, I do not know exactly, but not long. I suppose if some of those flowers had not been plucked, their seeds would have been ripe next week. I remember, when I was a little girl, I used to like to pick them when they were ripe, and blow the seeds away. We used to believe we could tell the time of day by the number of puffs it took to blow them all away."

"What is the true name for dandelions?" asked Anna.

"It is rather a long one, so perhaps you had better write it down. It is *Taraxacum Dens-leonis*. I do not know why it should be given that name, for I see nothing about it to suggest a lion's tooth, unless it be the irregularly notched leaves."

"Does *dens* mean tooth, Mamma?" asked Charley.



“Yes; our word dentist comes from it, and we have had it before in the dogtooth violet we analyzed a few days ago, whose full name is *Dens-canis Erythronium*. It will be easier for Anna to remember these names than you, because she knows a little Latin.”

“Are all botany names Latin, Mamma?”

“No, not all, but most of them are. This Everlasting, or Immortelle, you have gathered has a Greek name, *Gnaphalium*, which means a lock of wool. This is *Gnaphalium polycephalum*, or common everlasting. These leaves, you see, look very woolly. Now, the flowers of the immortelle, like the dandelion, are composed of tiny little flowerets, and there are a number of these in each little head, or flower.”

Grandma came in just then with some bright yellow flowers. “Here are some cowslips,” she said. “We are going to have greens for dinner, and Hannah found that some in the bed had blossomed, and thought perhaps you’d like to find the Latin name for them.”

“Have them for dinner?” said Charley. “Why, Grandma, you don’t eat flowers, do you?”

“No, dearie, not the flowers; but some plants are good to eat before the flowers come. After that they are tough. These flowers are earlier than usual; but, of course, we won’t cook them.”

“Let us look at them a minute,” said Mamma. “They

are very pretty and bright. Charley, do you think you can tell to which family they belong?"

Charley looked carefully at the leaves, stems, and flowers, and then said a little doubtfully, "The Crowfoot, I think, Mamma."

"Quite right. You see we have found more flowers in that family than any other. But I am afraid we shall find this under some other name than cowslip, for the cowslip belongs to the Primrose family and is very different. For example, it has only as many stamens as petals, and this flower, you see, has a large number of stamens bunched together in the centre. Cowslips generally grow from a *raceme*, or slender stem, while these flowers are arranged irregularly."



MARSH MARIGOLDS

Anna looked carefully over the divisions of the Crowfoot family, and then said, "You are right, Mamma, it is not cowslip, but Marsh Marigold, and has been wrongly called cowslip in this country. Its right name is *Caltha palustris*."

"Very well," said Grandma, "we're never too old to learn, you see; but I think we've eaten 'cowslips' so many

years for greens, we shall be apt to forget to call them marsh marigolds now."

"It makes no difference what you call them, so long as they are good to eat," said Master Charley, who had great faith in Grandma's cookery.

"Charley is quite right," said Mamma; "and I think we shall all be able to enjoy them at dinner time, even if a few flowers are lost by the plants being used for greens."

## CHAPTER XI.

### BUTTERCUPS



"Y! see what I've found," said Grandpa, coming in one day with a handful of bright yellow flowers. "Now I'm going to see who likes butter," and he held a blossom under May's dimpled chin.

"Oh, how can you tell with them?" asked Charley, coming forward to look.

"Very easily, sir," answered Grandpa. "Yes, indeed, Baby likes Grandma's butter, I can easily see that; and so do you, young man," he added, as he transferred the flower to Charley's chin.

"Of course I do. You can see that at the table," said Charley; "but, Grandpa, how can you tell?"

"Oh, it won't do for me to tell flower secrets. I think, my boy, you and Mousie will not be long in finding out for yourselves; and if you do not, perhaps your mother is not

so particular about keeping secrets as I am. Ladies never are, you know," and Grandpa cast a sly look at Mamma. "Here, I'll give you these to examine, and I guess you'll solve the mystery."

But they did not try long, for, in answer to their questioning glances, Mamma verified Grandpa's statement that ladies are not so particular to keep secrets—in this instance, at least—by saying, "These are Buttercups. You see how bright the petals are. Well, it is an old saying that if you reflect a yellow light from a buttercup upon any one's chin, that person is fond of butter."

"I guess every one is, according to that," said Charley, playfully holding a flower to Anna's chin, while Baby May put the test to her dolly, with the same result.

"Yes, I think so; at least, I never knew a chin which failed to reflect the golden light."

"What is the correct name for buttercups, Mamma?" asked Anna, who was always desirous of finding out all she could about any flowers with which she came in contact.

"One other name is Crowfoot, which, of course, tells their family, even if you did not know it at a glance. The name of the genus is *Ranunculus*, and you will find as many varieties as you did of violets, if not more. This is, I think, *Ranunculus fascicularis*, which is about the earliest of them. There is another, which I think you would find now, called wood buttercup, or *Ranunculus Pennsylvania*. It is also

called bristly buttercup, because its leaves are downy. Charley, you may go down to the edge of the woods and see if you do not find some there, while Anna puts these between the boards."

Anna brought the boards into the room, and while she straightened out the leaves, Mamma told a story to Baby May, which may be interesting to other little people.

"Once upon a time there was a little girl whose name was Carrie. She lived alone with her mother in a small cottage by a field, and they were very poor. The little girl had been ill for a long time, and though now she was able to be up, she was too weak to help her mother, as she wished to do. Her illness had cost a great deal, and now her mother had to work harder than ever to get money to pay for the doctor and the medicine, as well as to buy something to eat.

"The field opposite them was covered with beautiful golden buttercups, and as Carrie sat looking out of the window one morning, wishing for the thousandth time she were able to make some money for her mother, she remembered that some one had said there was real gold in the buttercups.

"'Just look, mother,' she said, 'there must be millions and millions of gold in all these flowers.'

"'Perhaps so, dear, but I am afraid it is gold that we shall never get ;' and the widow sighed a little as she thought what

a very few of the 'millions and millions of gold' it would take to lighten her burden.

"After her mother had gone to her work, Carrie thought again of the gold, and how much her mother needed it, and finally decided to get some. So she started to the field and gathered a large quantity of the yellow flowers—so large, indeed, that she had to stop and rest several times before she could get them into the house, for the little girl was still very weak.

"After a while, though, she had the supply in the little kitchen, and then she began to wonder how she was 'to get the gold.' She took some flowers and tore them to pieces, but in vain; for among the scattered petals she couldn't find a trace of the precious metal.

"Finally, a bright thought struck her. They had to use heat to prepare metals. She would put the flowers on and boil them, as her mother boiled the meat to get the strength into her beef tea when she was so ill.

"So she put them into the kettle, and, taking her little pail, went twice to the spring for water to cover them. Then she made the fire and put them on to boil. They boiled and boiled for a long time, until finally Carrie decided that if there was any gold in them it would surely show now, so she lifted the kettle and with great difficulty carried it out to the porch. Then she lifted the lid and looked for the gold, but to her great disappointment there was none to be seen.

Only a kettle full of ugly stewed weeds, for even the pretty yellow of the flowers was lost.

“Poor little Carrie! So this was the end of all her work. It was too much for her, and the little girl dropped down on the porch and began to cry bitterly. Presently she heard a voice say, ‘Well, little girl, you seem to be in trouble. Stop crying, and tell me about it.’

“Carrie started up fearfully, for she was a timid little girl; but she saw only a nice old gentleman, who spoke to her so kindly that she forgot to be afraid of him, and, after a little urging, she told him all about her disappointment.

“‘Ah,’ said he, as she finished, ‘I see how it is. Gold, my dear, is heavy, and would go to the bottom. Go into the house and get a large spoon, and perhaps we shall find some.’

“While Carrie did as he told her, his hand went into his pocket, and if any one had been near he might have heard a little splash, as if something heavy had been dropped into the water. But there was no one in sight, except a little bird up in a tree, and he did not tell the secret, but only sang, ‘Bobolink, bobolink,’ louder than ever when Carrie returned with the spoon.

“The old gentleman took the spoon and dived down among the cooked-up flowers, and soon brought out two large gold pieces, which he gave to Carrie, and then went away, looking as happy as the little girl herself.

“When the mother returned that evening, she found a



very cheerful little girl waiting for her, and her tired face brightened as she saw the money and heard Carrie's story.

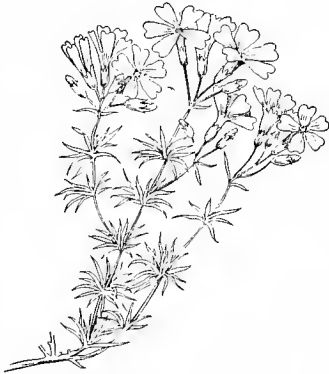
“‘Well, my dear,’ she said, as Carrie finished, ‘it was very good of you to work so hard to get the gold, but I am afraid if the kind gentleman had not come you would never have found it.’”

By the time this story was told, Anna had finished arranging her specimens, and Charley had arrived with the other one, which was as Mrs. Burton described it.

## CHAPTER XII.

GROUND PINK—RAM'S HEAD—BLUETS

ONE day the children made an excursion to the hill where they had first found the arbutus, and this time they brought home a large number of new kinds of plants. Among them were several of the *Viola Pedata*, or bird's-foot violets, which they promptly recognized from the description Mamma had given them.



GROUND PINK

Then they found a large quantity of phlox-like flowers trailing all over the ground. The flowers varied in color from bright pink to purple, and most of them grew on stems three or four inches long, which were attached to long stems or runners serving as roots, and the children pulled them up in strings several feet in length. The leaves were

short and sharply lanceolate, and Anna rightly placed the new specimen in the Phlox family; for upon examination it was found to be the *Phlox subulata*, or ground pink. Grandma called it moss pink, and had a large bed of it in the back

yard, but this did not blossom as early as in its native woods. Baby May greatly enjoyed playing with the long strings, and made wreaths for all her dollies. She tried to slip one over the head of Grandma's cat, but Tabby was a cross old cat and did not appreciate this attention.

Anna and Charley also found by the fence some real cow-slips, which Anna recognized by their hairy leaves and bright little flowers. This kind is known as the *Primula officilis* and is very scarce in this country; though a similar variety, but with large blossoms, is very plentiful in England.

A small plant with a purple flower of peculiar shape they found to belong to the Orchid family under the name *Cypripedium*. This name comes from two Greek words—one signifying Venus, the name of a Greek goddess, and the other, slipper—and was given to a variety of plants whose flowers were thought to resemble a lady's slipper. This particular flower is of a little different shape, and viewed in one way suggests a ram's head; hence it is frequently known as Ram's Head.

On a grassy slope, not far from the brook, they found a large number of dainty little blue flowers which grew so thick as to form a sort of sod over the ground, and the blossoms were very delicate in appearance.

The little flowers were somewhat trumpet-shaped, with the top of the corolla divided into four petals, which are blue at the tips and shade towards a creamy yellow at the

centre. Anna made the mistake of calling them forget-me-nots at first; but Grandpa, whom they met in the field on their way home, said they were Bluets, and that some children called them Quaker ladies, and Mamma promptly classified them as *Houstonia carulca*.



BLUETS

Besides these, there was one for which, after careful examination, the children failed to find a name. It had two little bell-shaped flowers, light purple in color, at the top of a slender stem. They had a faint, sweet odor, and the leaves were round and very slightly serrate, or toothed. They carried it to Mamma, who, after a little examination, said, "This must be the Twin Flower. I have never seen it before, and it is not common here. It usually grows in a colder climate, and its botanical name is *Linnaea borealis*. There is only the one species of it, and it was named in honor of Linnæus."



TWIN FLOWER

"Who was he, Mamma?"

"He was one of the greatest botanists we have ever had. I believe he was a Swede, though he took his degree

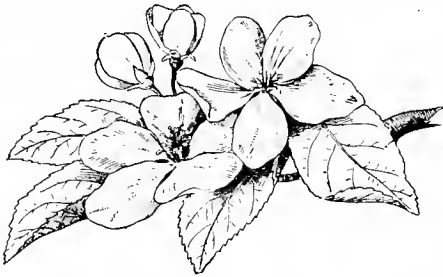
from a Holland university. His fame became world-wide. He studied the plants of almost all countries, and probably did more towards systematizing and classifying them than any other one man. When you go home, you will probably find a biography of him in the library, which I think Charley will find interesting also. And now I think we must all help to get these new specimens in order."

## CHAPTER XIII.

APPLE BLOSSOMS—WILD GERANIUM—COLUMBINE

THE apple trees were now in blossom, and Charley brought in a large cluster for Mamma to admire.

“Aren’t they sweet, Mamma?” he said. “I like to look at apple blossoms because they are such pleasant-looking flowers. Don’t they make you think of faces smiling at you?”



APPLE BLOSSOMS

“That is a very pretty conceit for my boy,” said Mamma, “and I think his adjective is right. They are pleasant-looking. How prettily the pink and white are blended in these! What a good study this spray would make for an artist!”

“Shall we analyze them, Mamma?”

“Certainly, if you wish; but as we know so well what they are, it is hardly necessary. I think, with Anna’s help, you can trace them readily from the beginning.”

Charley did so, and was very much surprised at finding them in the Rose family.

“Why, Mamma, apple trees are not roses, are they?”

“Yes and no. You may not find any resemblance at first, and yet I think if you compare an apple blossom with a single wild rose, you will find they are alike in many respects. Then if you observe the leaves of both, you will see that while apple leaves are simple, and rose leaves compound, they have some points of resemblance. Both are alternate in their arrangement and both have very decided stipules at the base of the petiole, or leaf-stalk.

“The petals of the flower, you know, are wholly separate, and in a few days they will fall, making the ground under the trees white. The calyx is superior to the ovary; that is, the ovary is beneath it. The ovary, you know, is the fruit of the apple, and it grows larger and larger under the calyx until it is full grown. You can always see the calyx—though it is sometimes called the blossom—on the top of every ripe apple. Have you noticed it?”

“Yes, Mamma, but I never knew before what it was.”

“No, but you will know now. I remember, when I was a little girl, I thought it was some kind of a bug, and was afraid of it until Grandma told me about it. The leaves are hardly out yet, but when they are, you will see that they are penni-veined, serrate-edged, oval in form, with an acute point, and underneath they are cottony or woolly. The botanical

name for the common apple is *Pyrus Malus*, but I dare say Grandpa can tell you another name for each of the different varieties."

One afternoon Grandpa brought a pretty plant from the fields. It had a light pinkish-purple corolla composed of five petals, and only one pistil, which was long and of a peculiar hooked shape. On account of this latter, botanists have called it cranesbill; but Grandpa called it Wild Geranium, and Anna found it in the Geranium family under the title *Geranium maculatum*.



WILD GERANIUM

That same evening Charley went with Abner for the cows, and in a swamp on the way he found quite a number of new plants. Among them was one that looked like a close tuft of grass, though it bore little blue flowers. He took some home to press, and Anna, who by this time had become quite expert in analyzing, promptly pronounced it Blue-eyed Grass or *Sisyrinchium Bermudiana*.

Another flower which made a particularly attractive specimen was the Columbine. Anna had been especially anxious to have this, because one of her teachers had once read an article to her class showing the reasons



why this little flower should be considered our national flower.

“You see, Charley,” she said, “it would really be a good emblem for us, because it can be found in every State in the Union, and comes in red, white and blue, our national colors.”

“Yes, but we have nothing but red here,” said Charley.

“Red is the only color that grows wild in the Eastern States, Miss Black said; but Grandma has the white and blue in her yard, and the plant is exactly the same. You see what odd shapes the petals and sepals have. People used to think it resembled a bird, and some one a long time ago thought it resembled an eagle, so it was called *Aquilegia*, which is taken from the Latin word for eagle. So you see in its botanical name we have our national bird.”

Charley was very much interested, and so was Baby May, when Mamma showed them how the little sacs held honey at the bottom, which the bees found it very hard work to reach.



COLUMBINE

## CHAPTER XIV.

### JACK-IN-THE-PULPIT—WILD LADY'S SLIPPER

THAT evening everybody was at work in the kitchen, preparing and arranging the specimens. Even Abner, the hired man, had become interested in the work of the little people, for Anna and Charley, despite their little faults, were sweet-tempered, well-trained children, who made friends of all who came in contact with them.



JACK-IN-THE-PULPIT

Charley had angered him at first with his boyish mischief, but had apologized so heartily when he saw the trouble he had caused, that Abner's heart softened towards him, and they became firm friends. In consequence of this, the children had several specimens that grow in woodland places where they were not allowed to go alone. Two such were added to the collection that evening.

One the children knew, from frequent pictures, to be the Jack-in-the-Pulpit, or Indian turnip. Its botanical name was found to be *Arisæma triphyllum*. The other, after analysis,

was found to be the Lady's Slipper, or Moccasin plant, which belongs in the Orchid family. This was a very handsome plant. The peculiarly shaped flower, which Anna had at first thought must be the pitcher plant, because its cup contained drops of water, was a bright pink, handsomely striped with dark lines; and the sepals, as the colored lanceolate leaves at the top proved to be, were deep purple in color. Its technical name is *Cypripedium spectabile*, and it is a member of the same family as the little ram's head, which the children had found earlier in the season.

While they were busily engaged in arranging their specimens on the kitchen table, the door opened, and in stepped Papa Burton, who had become so homesick for his little people that he said he could not exist any longer without a sight of them, even though his visit must be a short one. In the joy of welcoming him, even the specimens were forgotten for a time, until he called their attention to them by asking what had been done to promote the science of botany.

The next morning, when Charley brought some new flowers which had just opened, his father had a chance to hear a lesson in analysis, which pleased him so much that he



LADY'S SLIPPER

decided that Charley, too, deserved a herbarium to preserve his share of the specimens which had been so carefully collected.

Anna had received a number of invitations to attend the school commencement, which was now near at hand. When Papa saw how rosy and bright she looked, he decided that she might safely return to school in time to pass two or three of her examinations, which would help her greatly in the fall.

So, a week later, Anna set out for a few days in the city, taking her herbarium, to show her teacher that her spring vacation had been put to some use.

## GLOSSARY

*Acuminate*, tapering at the end.

*Acute*, sharp-pointed.

*Analyze*, to separate a plant into its parts for examination and study.

*Annuals*, plants which complete their growth in a year; that is, they flower, bear fruit, and die the same year they are raised from the seed.

*Anther*, the part of the stamen which contains the pollen.

*Biennials*, plants which require two years to complete their growth; that is, they spring from the seed one year, but do not flower and bear fruit until the next.

*Botanical*, relating or pertaining to plants.

*Botanize*, to collect plants for study and examination.

*Bristly*, furnished with bristles or short, stiff hairs.

*Calyx*, the outer set of the leaves which compose the floral envelope or perianth.

*Classify*, to arrange in sets or classes according to some distinctive properties.

*Cleft*, cut into lobes.

*Conical*, shaped like a cone.

*Corolla*, the inner set of leaves composing the floral envelope.

*Cotyledons*, the first leaves of the embryo.

*Cryptogamous*, relating to flowerless plants.

*Cryptogams*, plants which do not bear flowers.

*Cultivate*, to improve the natural conditions of a plant by labor and fertilization.

*Dicotyledonous*, having a pair of cotyledons.

*Digitate*, referring to that class of compound leaves in which all the leaflets are set at the apex of the leafstalk and stand out like the fingers of the hand.

*Downy*, having soft hairs or down.

*Embryo*, the rudimentary plant in the seed.

*Endogenous*, that class of plants whose stems increase their growth without showing circles, pith, or bark.

*Exogenous*, outward growing; that class of plants whose stems are composed of layers around a central pith.

*Fibrous*, composed of or containing slender threads or fibers.

*Filament*, the stalk of the stamen.

*Foliage*, the leaves of a plant in general.  
*Fragile*, very slender or delicate.

*Genus*, a kind of rank above species in flowers.

*Herbarium*, a classified collection of dried plants.

*Imbricated*, overlapping one another.

*Inferior*, lower or beneath.

*Involucre*, a whorl or set of leaves surrounding a flower or cluster of flowers.

*Lanceolate*, lance-shaped.

*Lateral*, belonging to the sides.

*Medicinal*, possessing curative or healing properties.

*Monocotyledonous*, having only one cotyledon.

*Mucilaginous*, having a mucilage-like quality or property.

*Native*, belonging to, or the product of, a certain locality.

*Ovary*, that part of the pistil which contains the seed.

*Palmate*, a leaf with divisions spread out from the centre like a hand with outstretched fingers.

*Panicle*, an open or branched cluster of flowers.

*Parallel*, running in the same direction.

*Perianth*, the complete floral envelope, consisting of both calyx and corolla.

*Petal*, a leaf of the corolla.

*Petiole*, the footstalk of a leaf.

*Phanerogamous*, flower producing.

*Phanerogams*, plants which bear flowers.

*Pistil*, the seed-bearing organ of a plant.

*Pith*, the soft cell-like centre in exogenous plants.

*Plumule*, the bud or first shoot of a plant, between the cotyledons.

*Pubes*, small soft hairs.

*Pubescent*, hairy, or covered with down-like hairs.

*Raceme*, a flower cluster with one-flowered stalks arranged around the sides of a general stem.

*Radiate-veined*, with veins running outward from the centre.

*Radical*, belonging to, or coming from, the root.

*Runner*, a slender stem, generally lying prostrate, with roots at the ends of joints.

*Scape*, a flower stalk rising directly from the ground, as in the common blue violet.

*Sepals*, the leaves or divisions of the calyx.

*Serrate*, with the edges or margin cut into teeth.

*Specimen*, a single plant preserved to represent a certain class or family.

*Spore*, a minute body resulting from the fructification of cryptogams, answering to the purpose of seed.

*Spur*, an appendage from a flower, resembling a spur in appearance, but

- hollow like a sac, as found in the violet.
- Stamen*, the organ in a plant which produces and dispenses the pollen.
- Stigma*, the end of the pistil which receives the pollen.
- Stipule*, the appendage at the base of the leafstalk.
- Style*, the stalk between the ovary and the stigma in the pistil of a plant.
- Torus*, the receptacle of the flower, at the end of the stem.
- Tuber*, a thickened portion of root, with eyes or buds at the sides.
- Tuberous*, producing tubers at the root.
- Vegetable*, belonging to, or pertaining to, plants.
- Whorl*, an arrangement of leaves in circles or clusters.





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