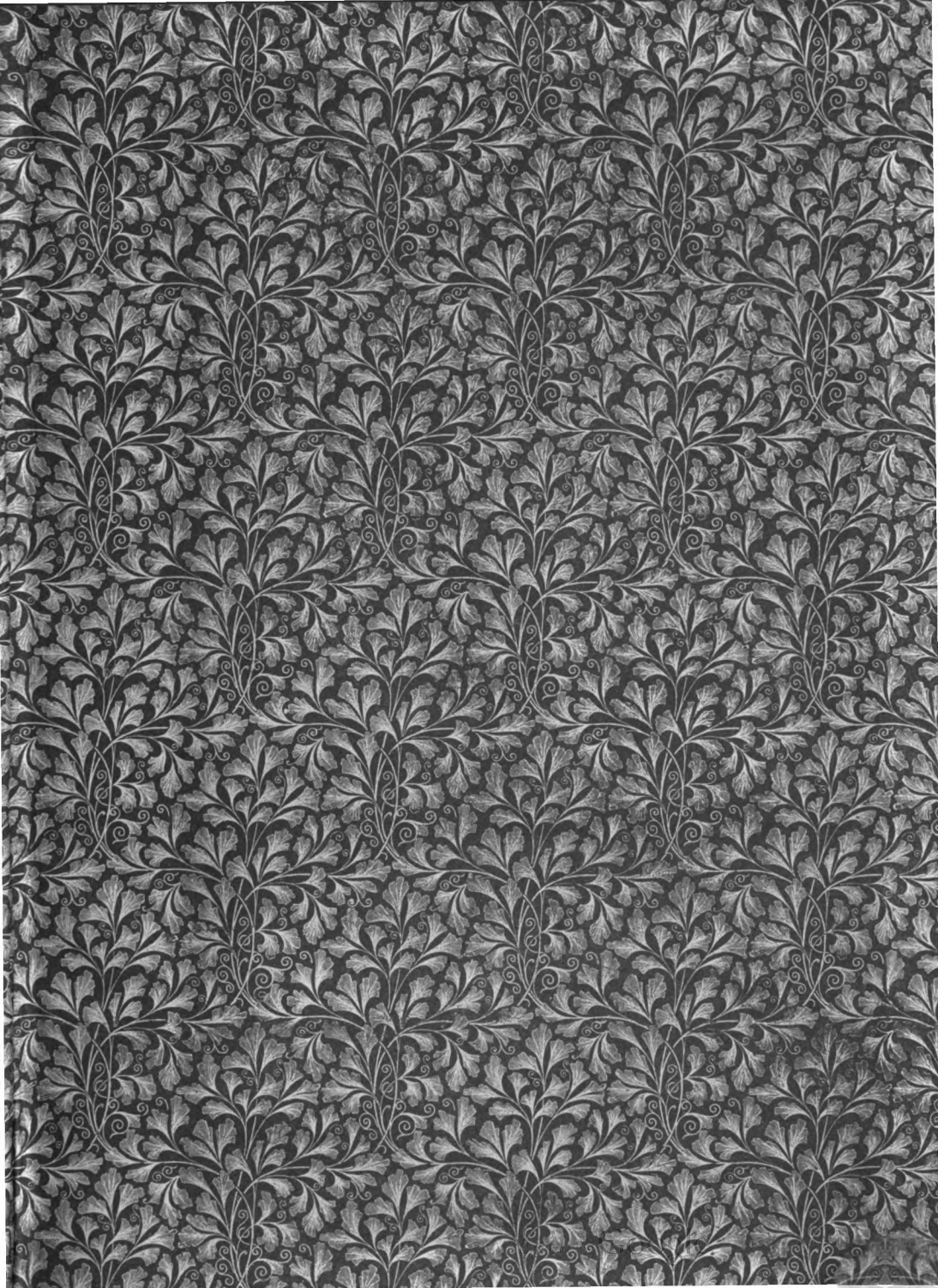
THE GUESTS OF FLOWERS

C. E. MEETKERKE



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A Botanical Sketch for Children.

BY

C. E. MEETKERKE.

WITH PREFATORY LETTER BY DR. KERNER.

GRIFFITH AND FARRAN,
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TO

PROFESSOR KERNER,

IN GRATEFUL ACKNOWLEDGMENT OF THE

PLEASURE DERIVED FROM HIS

'FLOWERS AND THEIR UNBIDDEN GUESTS,'

THIS SLIGHT BOTANICAL SKETCH FOR CHILDREN IS,

BY HIS KIND PERMISSION AND APPROVAL,

DEDICATED BY

THE AUTHOR.

PREFATORY LETTER.

THE love of plants has its nearest source in the sense of beauty, which is in many different gradations common to all mankind. The colour and shape of the leaves and blossoms produce a charming effect upon our eye, which no one is able to resist entirely. But the world of plants is quite as attractive from another point of view; it is that of examining the causes of the great variety of forms which present themselves to our sight. Plants are placed before us like riddles, and our imagina-

tion is actively set to work to solve those riddles.

It is true, people with love and taste for the fine arts will say—and indeed I have heard them do so—that Flora's lovely children are deprived of all their poetry as soon as the attempt is made to solve those riddles, to dissect plants, to inquire dryly and prosaically into the causes of their different forms. I am convinced, however, that plants do not lose any of their charms by scientific research into the meaning of their shapes; on the contrary, the interest they create is still increased by studying the causes why one plant has such leaves, another others; why blossoms have only these peculiar forms, and not different ones. Such a 'dissecting view' of the

subject affords even a mental enjoyment of a much higher kind than mere æsthetic contemplation, which, after all, is apt only to produce dim sentiments and confused notions. If I should have contributed by my work to strengthen this idea, the aim which I have in view will be arrived at, and I beg to tender you my sincerest thanks for the valuable assistance you have afforded me by your book in attaining that aim.

KERNER.

VIENNA, *June* 6, 1880.

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CHAPTER I.

THE GUESTS.

CHILDREN, the whole bright world is feasting! Would you not also like to give a feast — a banquet to your friends? Nature has spread her banquet, has opened her doors, has lighted her candles, is waving her flags. The gloomy winter has passed away, and the boisterous spring, which did not seem to mind how many tender branches it tore off from the trees, or how

many promising buds it blighted. The warm, kind summer, with its sunshine, its gentle breezes, its comforting showers, is with us. It is the very time to give a feast.

And whom will you invite? Whom will you choose to be your guests? Will you open your jars of honey; will you show the way to your banqueting room; will you wave your many-coloured banners, and light up all your lamps, for idle and greedy guests? or will you invite industrious and active ones?

Will you welcome those who avoid the direct paths by which you can see them coming, and who steal in by the back doors and peep rudely in at the windows, or those who are proud and joyful, who march up boldly, singing as they come?

There is little doubt which you will choose: that you will keep out the lazy and impertinent visitors, whose presence would spoil the pleasure of the feast, and that you will gladly welcome those who deserve to play because they are also ready to work!

Then, children, if this be your choice, you will not be surprised when I tell you that it is just the same thing with flowers. When the honey lying in their perfumed cups is ready for the guests who are to partake of it, then comes the question what guests shall be bidden to the feast.

The lazy ones?

The greedy ones?

The useless, rude, and impertinent ones?

Or the good, gay, bold, and honest fellows

who have plenty of work to do, and who do it?

The flowers decide the question as easily as you; and I think it will interest you very much to have the ways by which they welcome some of their visitors, and keep out others, explained to you—explained very simply until you are able to read about them for yourselves in most delightful books which are too hard for you now, which you would shut up, shaking your heads and saying, 'I do not understand.'

I shall just tell you the simple story of what is going on under your very eyes—going on every day, every hour, every minute. You have only to open them to see for yourselves that what I tell you is real, and perfectly true.

CHAPTER II.

THE BANQUET.

IT is very easy to walk about and see nothing, but that makes walking about one of the dullest things that can possibly be imagined. You would think it hard were a thick veil to be tied over your face whenever you went out of doors, so that you could only just see where to go and no more; but if you merely use your eyes to make sure not to hit your foot against a stone, you yourselves tie a veil over

your face, and lose almost all the pleasure of your walk.

The more carefully you observe, the more you try to comprehend the curious and interesting things which are above your head and under your feet and all around and about you, the more pleasures you will gather up into your stores, the happier and the richer you will be.

Look round upon these heaps of blossoms! Such a lot; so many and so sweet.

'You cannot see the grass for flowers.' They seem as if they nod to you and smile upon you, and would say, if they could speak:

'Think of all these treasures,
Matchless works and pleasures,
Every one a marvel, more than thought can say.'

This is the banquet Nature spreads for bees and moths and many sorts of flying creatures.

At first you might think that she was wasteful, that she lavished too many good things; but, on the contrary, she is orderly and economical.

It is only at the proper time, and not for very long, that she gives out her honey, waves her flags and lights up her many-coloured lamps—not till the feast is ready and the favoured guests are invited; and then, when the feasting time is over, she puts out her lights, sweeps off her perfumes, and allows her doors to open and shut as they will, not careful any longer to keep out useless visitors, who, moreover, scarcely care to intrude when there is nothing tempting left within. You might have thought perhaps that flowers,

'The perfumed and the pure,'

could have no enemies; but that is a mistake, for they have many.

It takes but little to destroy the beauty and the use of a flower! Should you not tremble for their safety if you saw a herd of cattle turned into a field full of bright and tempting blossoms?

But though they are in danger, they are not unprotected; for cattle, strange to say, are not attracted by bright-coloured blossoms, and you may safely offer them the best of your garden flowers: they will not nibble at one. If you watch them grazing, you will see how they snatch at leaves and grasses, and avoid the flowers—nay, even if the flowers and leaves are so mixed together that one cannot well be taken without the other, they will pass over whole patches because they dare not

run the risk of getting a flower by mistake; and this is probably because there is a sharp, unpleasant taste in coloured petals: when they are dry, however, the taste is not so strong, so cattle no longer object to them. Now it is all very well when they can choose for themselves and have plenty of all sorts of good things to choose from. They can say, 'No, thank you,' to the honeysuckle and the violet and the convolvulus; but if by any chance these should have got mixed in the grass and be made into hay, it would be excessively troublesome if horses and cows and ponies were found to be so very particular.

Sometimes the foliage of plants, such leaves and parts of them as are needed for the growth of the flowers, are very thick and leathery, and some are

provided with such stiff needle-like points that a grazing animal would get its nose pricked if it approached too near them, just in the same way as it would get pricked if it attempted to eat the lower leaves of the Holly tree. Flowers have many more dangerous foes than kind and comfortable cattle, and what I have at heart is to introduce you to their welcome and their unwelcome visitors, that you may understand exactly and clearly the reason why some are welcome and some are unwelcome, that you may see for yourselves who are the guests Nature delights to invite to her banquet, and who are the marauders. That is a long word! It means wandering thieves.

Before this can be made perfectly plain to you, you must take the trouble to learn the general plan of plants.

You must understand the way in which they live and breathe (for plants do breathe, or else they could not live), and what is meant when we speak of their organs.

CHAPTER III.

THE INTENTION.

IT is simple enough.

A few minutes' attention, and you will learn by heart, that a plant is made up of three different parts—

THE ROOT,
THE STEM,
THE LEAVES;

that it produces flowers from which comes fruit, and from the fruit, the seed.

The root is buried in the ground and draws nourishment out of it for the stem. Many little

rootlets may be seen springing from the main root which push themselves along as they grow, the tips of each being protected by a tiny sheath which fits it closely, and is always renewed by a fresh one ready underneath if it gets worn or withered.

This is a beautiful contrivance, which you should look at with the help of a lens or magnifying glass, as it is very delicate.

Then it will seem much larger, and you will be able to see it much more clearly.

The stem rises out of the ground, bears leaves arranged on different sides of it, and the flower.

Now whatever is borne by the stem and its branches may be called a leaf. There are foliage leaves and flower leaves.

Gather a buttercup.

Now let us examine it very carefully. On the tip top of the round green stem you will find five outer leaves quite separate from one another; these are called *sepals*.

Taken all together, they make the *calyx*. Each sepal is either a pale yellow, or rather brownish, with a rim of green. No two flowers are ever quite the same.

Immediately inside the calyx are five much larger shining yellow leaves set round, each being placed between a sepal and another sepal.

These leaves are called *petals*. Taken together, they make the *corolla*.

First pull off the sepals.

Then the petals.

You will see a lot of yellow thread-like stalks, rather thickened at the top.

These are *the stamens.*

They may be considered the third set of flower leaves, although they do not look very like leaves.

The thick part at the top of each stamen is a box which holds a yellow dust called *pollen.*

Pour a little out into the hand. When the pollen is ripe, the box splits open and lets the dust fall out.

Now pull off the stamens.

In the midst of them you see a sort of knob. It is made up of several closely-packed green leaves.

The fourth set of flower leaves.

Each of these is called *a carpel.* Cut one open lengthwise, and you will see that it con-

tains a single little pale-coloured body which will in due course of time become a seed.

Taken together, the carpels make what is called *the pistil.*

These are all the parts or organs of a flower.

Now everybody in the world is well aware that bees and butterflies could not live without flowers; that they feed upon the honey and the pollen, and have little other food, so that they would die without the bright blossoms which we all love; but it is not everybody that knows how flowers themselves need insects, and desire their help. I will tell you why they need them, and what sort of help it is that they desire.

I have described to you how stamens hold a quantity of yellow dust called pollen.

Now it is necessary that this pollen dust should

fall upon the pistil, which I have also told you holds the seed.

If the pistil were not well dusted with the pollen, the seed would not set or ripen; and there are few flowers that are able to manage this by themselves, for it is a very curious thing that although the pollen is so near to the pistil, on which it would seem to be intended to fall, there is generally some hindrance which prevents it from doing so. Sometimes the stamens stand below the pistil, and as the pollen dust cannot fall upwards, it is clearly of no use. Sometimes the pistil is withered before the pollen is ripe (it does not fall out until it is ripe), sometimes the cases which contain it turn away, as it were, outside of the flower; and there are other curious ways by which pollen dust is prevented from

falling on the pistil of the self-same flower; therefore this cannot be Nature's intention. Then what does she intend?

Just this.

That the pollen which is borne by one flower shall be spread upon the pistil of another—not of a different kind, for that would be of no use, but of the same kind.

It is not very difficult to discover that insects are expected to do this. We see that they do it.

Those who are the most active about their business, that is, who bring upon their heads and legs the greatest quantity of pollen, who spread it upon the place where it is wanted, are those rich and generous visitors who are welcome to flowers.

For them the glowing petals—the sweet attractive scents—the exquisite honey we call nectar—are all prepared.

These are the welcome guests.

They are led to the banquet.

They are rewarded for their work.

CHAPTER IV.

THE ENEMIES.

BUT also there are unwelcome guests.

There are idle and useless fellows, who crawl listlessly over lovely petals, and look into perfumed cups. They long to get at the nectar,—they are very fond of sweets,—but they are not inclined to go to work for a dinner; and if it were only to be got at by spoiling a flower, they would not very much mind. They are more than unwelcome, some of these creatures—they are dangerous.

And how should flowers protect themselves from all such greedy mouths?

There are a great many ways.

There are prickles pointing up, and pointing down, and pointing sideways, and this way and that. They are sometimes set upon the stem —sometimes on the leaves—sometimes, but not so often, on the petals.

Look at a thistle head. It is a thicket of thorns!

Look at the blue cornflower.

The stem and leaves are smooth, but round about the blossom are a set of sharp stiff teeth which overlap one another.

You do not see any prickles?

But you are looking down upon the flower, and creeping creatures would look at it just the other way: they would look up at it; and what

would they see? Why, a lot of stiff points—a lot of dark hairy bristles just under the flower, just under the slender little purses full of honey.

Slugs and snails stop short when they come to such hindrances, and turn back! You can see this for yourselves if you watch their lazy movements, coming 'slowly, oh, so slowly,' along, expecting a good dinner at the end of their walk; but they do not care to get pricked in obtaining it.

Snails are sensitive creatures.

Bristles and prickles and stiff hairs have also another use. They do not only serve to keep out uninvited visitors, but they point out like finger-posts the road a welcome visitor should take; for it is not unfrequently the path by which an insect reaches the flower that makes it either a welcome or unwelcome guest.

Let us just suppose that an insect who is provided with wings should take it into his head to fold them up and to climb over the stem and the leaves, stealing by a back way into the flower. He would then avoid touching the pollen, and would probably creep out as he came in—a robber, not a guest! But the prickles warn him off. They seem to say: 'Not so; take wing: your wings are meant for use. Fly in by the front door, which is open for you. This is the road—here, where no swords are crossed.'

There are lines and spots beside, which are evidently meant to show the right road to the nectar, and all may be called by the pretty name of path-pointers.

It is not necessary that an insect should be

exceedingly sagacious to understand these silent signals. There are ways of telling people what they ought to do without making much noise about it. For instance, let us imagine that you were taking a walk which you knew would bring you to a place where you could rest and find a delicious supper prepared for you, and that suddenly you came to a spot where several paths met, and all, except one, were full of brambles, the very thorns themselves would seem to say,

'The path without us is the path for you.'

Now moths and bees are very sagacious creatures, neither nods nor winks are lost upon them; and when you have read about their many clever ways, you will begin to doubt if

you yourselves are even half as clever: you might even come to the conclusion that of all created things, children are the least self-helpful.

They expect everything to be done for them, and they have everything to learn.

But, truly, there is a great pleasure in learning!

Perhaps it is almost the very pleasantest possible thing; and the older and the cleverer you grow, the more pleasant it will appear to you.

Insects are born clever! Children have to be taught how to become so; and if they feel a little sad at thinking this, they can get quite comforted by remembering that it is their very ignorance and helplessness which makes them so dear to those who teach them, and that it is better to be beloved than to be sagacious.

You will agree with me that it is an impertinent thing to creep in by a back door; but the intruder does not always get off scot free—indeed, he has sometimes to pay with his life for poking in his nose where he is not wanted.

CHAPTER V.

THE DEFENCES.

IN almost every drooping flower you will find hairs.

Look at the campanula. It is bell-shaped, and is called *bearded* because there are long twisted hairs which close in the mouth of the flower.

Can you guess the use of them?

It seems clear that they are meant to keep out intruders, especially caterpillars, who are particularly fond of creeping into bell-shaped flowers.

They hunt about, in their noiseless, careful way, for quiet corners in which it might be safe to lie a long time undisturbed; and should they not find a tent ready made, they manage to put leaves together so as to make one. Their proceedings are wonderfully curious; but they study simply their own convenience, and become a terror to the places they choose for their purposes. Quite naturally! How could a visitor be tolerated who came only just to curl himself up in the best bedroom for three weeks or so?

Prickles and stiff hairs are excellent defences against soft-bodied animals; but what is to be done with insects who have coats of armour on? Well, one way is by tangles of hairs inside the flower, with just a hole for a long proboscis to be thrust in; whilst insects who

have smaller organs are easily kept out. If you pull to pieces a flower of the common vervein, you will see this, or still better in passion flowers, where the nectar lying in deep pits is guarded by fringes of hairs forming a sort of trellis work, so that it looks as if it were in a cage.

Only strong flying insects that approach the flower from above can push between the bars of the trellis. Sometimes these protecting hairs, which are generally like fringes, and when shorter and thicker like little staves, are gathered up into tangles or bundles which block up the entrance to the pits where the nectar lies, as plugs of wool would do, shutting out weak insects, but not preventing the approach of larger ones. If you put a flower of the white alyssum

under the microscope, you will observe that the leaves of the flower cup, the calyx, are cut down so deeply, leaving such a wide space between each, that small insects who had crept up from the ground might easily get at the nectar; but then they are shut out by a number of small hairs crossing and recrossing each other, so as to form a sort of lattice work between the sepals. Tiny marauders have no power to break through the lattice work; at best they can only use the crossed hairs as bridges to get up to the centre door of the flower, and then there is a great danger of being caught in the tangles. Very likely you have been waiting all this time to ask, 'What insects have coats of armour on?'

Ants have, and they are dangerous enemies;

for they are so clever, so persevering, and so fond of sweets. You know how quickly they discover a cupboard where honey or sugar or preserves are kept. It is almost impossible to shut them out. They climb up the walls of a house without any difficulty, and will make their way quite well to rooms on an upper storey.

How cleverly they plan their journeys—in what order they march—how they fight their battles—how they live in their cities, has been told at length in many books. It is very pleasant reading indeed. You shall hear an amusing anecdote about them. And that may lead you to hunt about for stories of ants, and to watch their curious habits for yourselves.

A colony of ants—for ants, like bees, like living together in great families—discovered that some

pounded sugar had been scattered on a window ledge. It had been scattered by an observant person, who admired their industry and liked to watch their ways. They trooped up every morning to feed upon it. The little black stream of busy creatures might be seen going quickly and steadily up the side of the house, making sure of their feast, and creeping down again. They were contented.

That was their only attempt at thanks. Perhaps it is not a bad sort of thanks!

One day it was suggested that some sugar should be put in a small vessel, which should be hung by a string to a bar running across the window, just to see what the ants would do then.

But that they might know what treasure was

in store for them, a few ants were placed with the sugar in the vessel.

These busy creatures forthwith seized on the little bits of sugar, and soon discovering the only way open to them was up the string, over the bar, and down the window frame, rejoined their fellows on the sill, whence they could resume the old route down the steep wall into the garden. Then for a few days many ants went up and down by this new way; but one morning it was noticed that the ants were stopping at their old place, that is, the window sill, and were getting sugar there. Not a single ant any longer travelled up the path which led above. This was not because there was no more sugar in the vessel, but because some dozen little fellows were working vigorously

and incessantly up aloft, dragging the sugar crumbs to its edge, and throwing them down to their comrades below on the sill—a sill which they could not probably see![1]

How clever of them!

How hard-working!

How unselfish!

This story is so much to the credit of ants, that I must remind you they are sturdy little thieves all the same!

[1] Gredler, *der Zoologische Garten.*

CHAPTER VI.

THE CLUE.

NOW if there are no hairs, or webs, or cages, or prickles to bar the passage of unwelcome guests, one may feel sure that the door of the treasure cave—that is, the opening to the place where the nectar lies—will be closed against them in some equally effectual way.

In some cases, nothing but sheer strength will open the door. It remains closed till it is opened by the guest himself, who must give it a good

push; and that can only be done by a large insect: the smaller fry may as well go back at once. You yourselves might just as well attempt to knock down the walls of a house.

If you examine a pretty flower which grows very often nearly wild in cottage gardens, the *dicentra* (it is called by country people Dutchman's breeches, on account of the peculiar shape of the corolla), you will wonder how it can be opened at all by an insect. The nectar is so safely shut in by two large pale pink petals, which fold quite over the stamens, that you would think they must be torn before a creature could get its proboscis anywhere near.

A strong bee going hard to work will burst them open; it would be very curious to watch the walls gradually giving way, strong as they are,

and as you will find out that they are, if you try to separate them with your fingers.

In some flowers, *nigella*, for instance, which is a little different to the common *hellebore*, the dishes where the nectar lies are covered over with moveable lids. Each petal is hollowed out to hold the nectar, something like a spoon. The lid closes over that part which contains the nectar, and can be raised only by a strong animal. You may see ants attempt to raise it, but they fail.

It would be almost an endless task to describe the different ways by which the shape of the flower itself forbids the entrance of unwelcome guests.

Sometimes by crowded stamens, standing on guard, like little soldiers before a nectar pit: some

flowers have a great many pits, as many as there are stamens, then each stamen stands before his own pit; sometimes by bumps and humps, by curves and twists; sometimes by long passages, all fulfilling the same purpose. They all keep out unwelcome visitors.

There is a very desperate deed which some very desperate marauders have been known to do, and that is to gnaw through a petal to get more quickly at the nectar within, if the proper passage whereby to reach it should be too long or too twisted; but this robbery is generally prevented by the calyx standing out so far from the petals that no proboscis is long enough to reach them.

This is a simple but a perfectly efficient protection. You will see it in many different

kinds of flowers. Water, of course, is a perfect protection to plants. You will find some which are placed, by the formation of their own leaves, as it were in a pond. The leaves are thick and hollowed out to hold rain or dew, and are set in rosettes, sometimes in one large rosette at the bottom, sometimes in many small ones up the stem.

It is curious to remark for how long a time rain or dew will remain in these leaves.

Look at the common teazle. Its flowers on the top of the long stem, protected by its rosettes, are quite safe from insects; for a drop or two of water is as great a hindrance to a small animal as a river would be to you; and when you are inclined to say, 'How could such a trifle prevent any sort of creature from taking

his daily walk, or putting in his nose where he could find plenty of honey for his supper?' you must stop to consider what is the size of the creature and what is the size of the impediment.

Plants actually growing in water are so perfectly protected from small creeping insects that they need no other safeguard. They have no bristles or prickles or any signs of warfare about them.

Look at the large lazy leaves of the water lily.

How quietly they lie on the water! How heavily they seem to sleep! No robbers can approach the lovely flowers, so rich in sweets, which rest upon them.

There is a pretty German story of a little

child who dreamt that he gathered a water lily, and that the lake where it grew, and the woods, and the mountains, and the moon, were all so angry with him that he was quite frightened and had to go to his mother to be comforted. It is quite true that they are protected from greedy hands and greedy mouths in a very mysterious manner.

Beetles, and ants, and slugs, and snails must be contented to watch them from the banks of the pond without the faintest hope of getting any nearer.

But what do you think happens if the water should run off or dry up, and the plant be left at the mercy of impertinent visitors? Why, then a quantity of hairs start out on stems and leaves; and these are sticky, so that any insect that may

try to creep up to the blossoms is caught and held in a trap.

Struggles are useless! The intruder can get no farther on the road.

He cannot even get back. But should the ground be once more flooded, these sticky hairs disappear again; they are no longer needed. Stickiness is in many ways useful to plants.

You must often have noticed it on the cover which folds round many buds in winter time, wrapping them up like a greatcoat.

The grass under chestnut trees is often covered with these sticky coats, cast off by the buds when the young leaves first begin to uncurl in the spring sunshine; and a like substance is often found on the stem, or the leaves, of the calyx of plants, and is no doubt placed there on

purpose to guard the nectar from unprofitable visitors.

It is a most effectual protection, whether it be placed on little hairs, on knobs upon the leaves, or just under the skin of the stem; for insects stick to it, and the more they try to get away, the worse it is for them.

Of all the safeguards furnished to plants, this sticky substance appears to be the most annoying to uninvited guests. It is found in different places upon different plants. In the common butterwort, you will see that the leaves are covered with it, which gives the plant a clammy sort of look. Some primroses are sticky with it, and there are alpine plants which have knobs like mushrooms on their leaves, each knob containing several cells full of sticky slime. No

small creature coming in contact with it could ever again get free.

Some plants are so full of milky juice, that it flows out in quantities upon the slightest touch; an ant attempting to climb up the stem will soon make rents in it, and he is glued down. The more he tries to get away, the larger are the rents he makes, and the greater quantity of milk flows out.

This is a sad snare for tiny robbers; for the stem looks so soft and smooth, they cannot tell that there is any danger till they find they are caught and held fast.

Now, children, let us see what you have discovered! A great deal in a little time, I think. You have seen for yourselves that at a certain time of year, Nature sets forth a banquet, and

that the flowers which then, and only then, are full of nectar, have many visitors,—that some are welcome, some very much the reverse.

The welcome guests are those insects who, whilst feasting, spread about the precious dust which they have brought from other flowers in thankful payment. They have brought it quickly through the air, have scattered none of it. They have come in at the front door. They have not picked a hole in the petals. They have not got stuck to the leaves. They are in no danger of being drowned in the honey.

The unwelcome guests are those who bring no presents, who creep in by holes and corners, who stumble about, who fall headlong into the cups, who besides not being useful sometimes even do harm.

You have learnt to understand a great many ways by which plants are protected from their enemies. You have seen how they are carefully and cleverly guarded

By Prickles,

By Hairs,

By Sticky Pieces,

By Water,

By Curled or Bent or Twisted Petals.

You have got the clue to the riddle! Wonders without end have been displayed for your delight.

You can add to your store of marvels daily—hourly—by patient and diligent observation.

You can find out new contrivances and try to understand their purpose.

To discover the true meaning of each beautiful

and curious device has been thought a task befitting many clever and learned men; we may all follow in their steps, and take their kind and gentle help to climb the hill of knowledge. Leaning upon their strength, we shall find new beauties, new marvels, new meanings, in all which is around us; we shall be led into a pure region of joy and wonder, and when the evening comes shall thankfully

'Lie down, like a tired child.'

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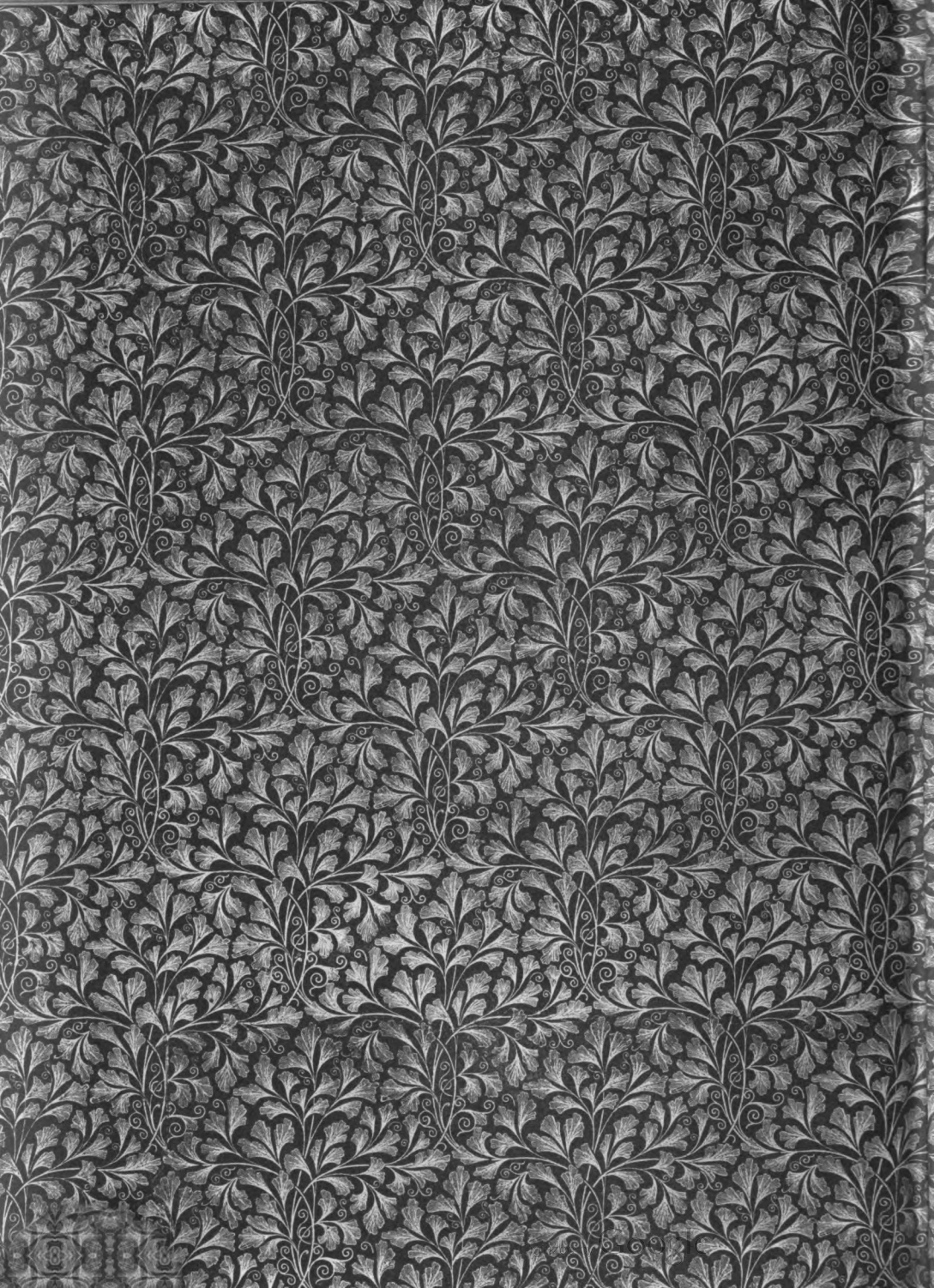

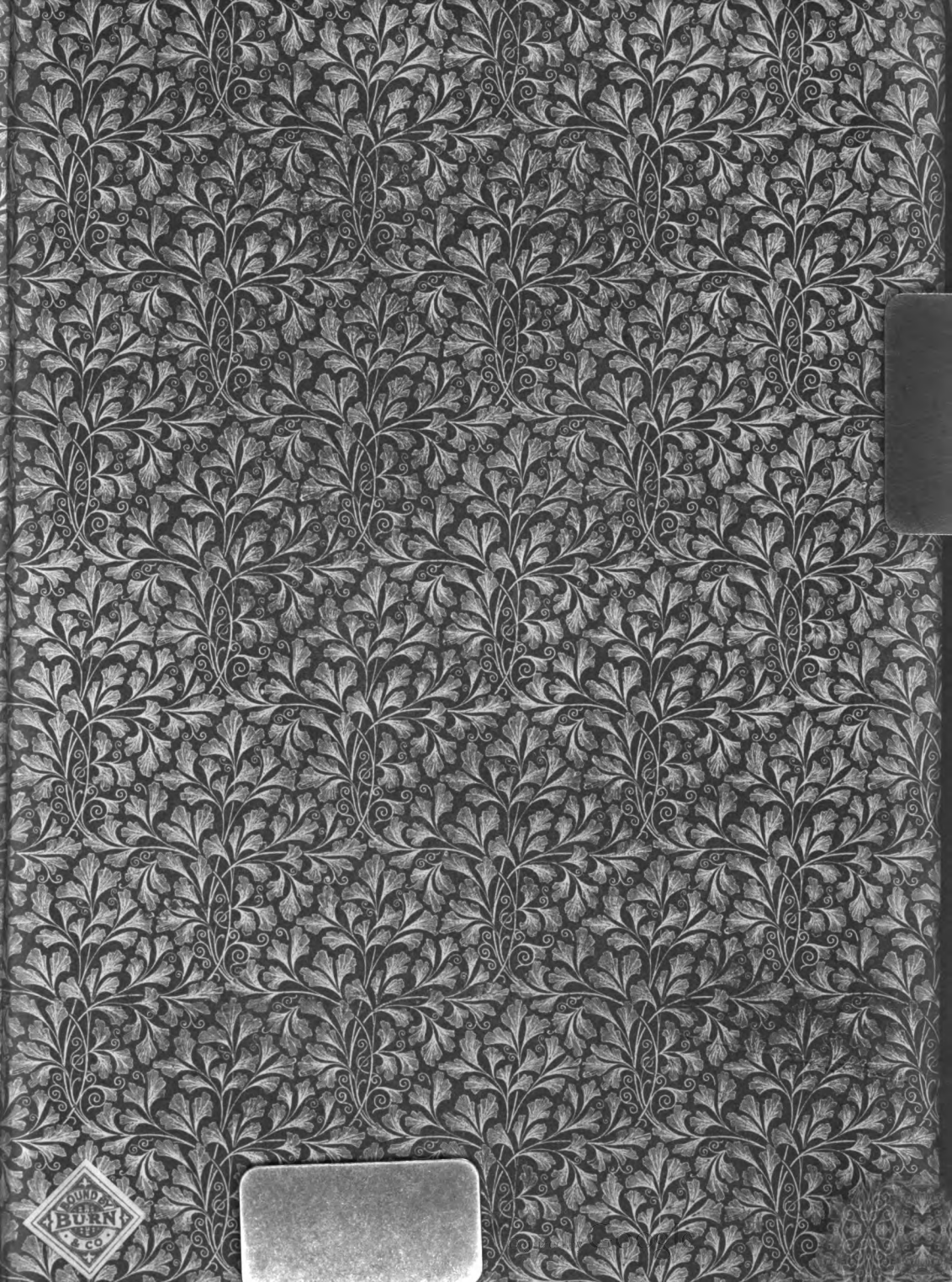
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