

Then, girls, put on your wings of imagination—few girls are so poor as to lack these—and let us away, away for millions of miles, not resting until we imagine ourselves in the centre of our planetary system.

After a short flight of probably about 100 miles through our atmosphere, we pass into the light, elastic, invisible æther which floats in space beyond. This æther keeps up a perpetual movement, rippling on in a constant succession of waves. Arrived at the end of our journey we ascertain the origin of this undulatory motion. All around the sun gases are incessantly whirling, and as their atoms strike against each other with some violence they produce both light and heat, shaking the æther around and sending off the sunrays—the tiny waves—on all sides. How inconceivably vast their work appears when we remember that it has been carried on for countless ages, and that the amount expended on our earth, great as we justly feel it to be, is, in reality, small compared with the whole!

I called them tiny waves, and such, indeed, they are, for 50,000 of them are contained in one inch of space, and so rapid are they in their progress that they travel the ninety-five—or, according to some later authorities, we believe, over ninety-one—millions of miles from the sun to our world in about $7\frac{1}{2}$ minutes.

Started on their way, the course of these busy rays is straightforward, but, as they journey on, various interruptions are met with, such as going from one medium into another of different density, or, meeting with a substance through which they cannot pass, or only in part, these interferences cause them to bend, to divide, to rebound, producing reflection. Thus are objects made visible to us by the rays of light being sent back from them to our eyes. Each substance has its own power of absorbing or scattering these rays, or of letting them through; for instance, a clear window-pane of glass allows them almost all to pass through it, but the wall opposite upon which they fall sends a greater or smaller number back through the glass again to us—supposing we are looking in from the outside—and the wall is reflected to our eye, or, as we say, we see it. Bright metal tales in scarcely any light-rays, hence glass covered on one side with quicksilver forms a powerful reflecting mirror—a looking-glass.

Now all of you are familiar with the fact that an oar dipped in the river appears to slant upwards. This is because the rays touching the oar, and rebounding, have passed from air into the water, which is a medium of greater density. It matters not whether the medium entered be denser or lighter than the one just left, the mere change of density occasions the appearance to differ from the reality. It is this power which causes the "mirage," with its magical effects, when fairy reflections of distant landscapes are seen in the air; when objects below the horizon, thus out of ordinary vision, appear represented in the "ocean overhead"; when weird-like shadows, that seem real, glide along the mountain; or, the similar phenomenon of vessels or icebergs hanging topsy-turvy in the sky. How many a thrilling ghost story may not these merry beams be innocently responsible for!

But now I must tell you that beautiful as an undivided sun-ray is, it shows fresh loveliness when divided. It sounds strange to talk of *splitting* a sunbeam, but you have often seen this wonderful operation performed. Whence come the hues of that glorious "arc of light"—the rainbow? What causes the band of soft yet brilliant colouring on the wall or ceiling, as the sunlight plays upon the glass pendants of the chandelier or lustres? What makes a fairy kaleidoscope even of a soap-bubble? Just an unravelled sunbeam! Each beam is made up of seven waves of different lengths and colours, the colour apparently de-

pending upon the size. The longest wave, the red, is always seen on the lower, or left, side, on account of its being the one least liable to bend; the others range according to size—orange, yellow, green, blue, indigo, and lastly, violet—the smallest wave, being about half the length of the red, and the most bent, or, scientifically speaking, the most refrangible. For although I have not yet mentioned the word which seems to alarm some young folks, let me tell you, in talking of *bent* sunbeams, we are really entering, though in a very elementary manner, upon that difficult subject, refraction. You must understand that this power of refraction is not only influenced by the differing density of the medium, but by its nature, its shape, the form of its surface. The smooth, level surface of a plate of glass permits the rays to go through in a straight line; but in a three-sided prism of glass the surface is placed diagonally, in consequence of which the ray is divided into its several colours, these not being of equal refrangibility. If the surface is concave, the rays diverge like the sticks of a fan; whilst if convex, they converge and form a cone of light. So to paint the rainbow on the cloud, the rays that enter the upper part of the little globes of water, the raindrops, are refracted; other rays, within a certain angle, bringing the beautiful prismatic colours to our sight. To enter more fully into this subject would be out of place in such a paper as this, but there is one other marvel due to sunshine of which I must speak, one in which every girl takes an interest—colour. What a sombre place this earth would be without that beautifier! Yet were it not for the sun-rays we should miss its charm.

As we have already seen, substances retain fewer or more of the light waves. Some keep all but one—such as grass, which, keeping all but green, sends that back to us, and thus the grass looks green to our eyes; whilst your sheet of note-paper, sending *all* the seven colours back, is white. If any of you wish to prove that these seven colours form white, let her take a round piece of cardboard, and paint it in the *exact* shades, in their *right* order and *proportion*; then spin it very quickly, and she will see only white. Although we have but spoken of beams of light, there are others which help to compose a sunbeam, and which, though invisible, are of as much if not more importance than their companions. I refer to the rays or waves of heat.

Their waves are of greater length than those of light, therefore have their place by the side of the red wave.

I can only just remind you how, by their power, they warm the soil so that it is brought into activity, and vegetation develops and grows; how the very life of our bodies is greatly dependent upon them; how imprisoned for ages in the coal, they burst forth afresh, helping to produce such wonder-working agents as steam, &c.; how they send the water-vapour up to gather into clouds or heat, and render the air light, so that, rising, it forms winds and air currents. But you will readily see the greatness of the work given them to accomplish. Besides these, there is a set of waves of chemical power, which, being still smaller than those that form the violet tint, have their place by its side. Of this power I must, however, say no more than that we owe to it, amongst other things, photography.

What more fitting emblem of a warm-hearted, busy maiden than one of these bright servants of the "Father of lights!" What a picture of her joyous life, seeking to gladden and help all those whom she can influence, the very hindrances in the way only serving to develop fresh beauty of character. Does not each of our girls desire to be "a sunbeam in the home"?

ANNIE MINISTER.

DAISY AND BUTTERCUP.

By the Author of "I Promised Father."

CHAPTER IV.



KATY went home that afternoon sorely troubled in mind for her poor little friend.

According to her usual custom, her first care was to outpour all to her mother; telling her all the sad state Stella seemed to be in, the unsatisfactory nature of their interview, Mrs. Branscombe's coldness and apparent want of sympathy with her daughter, and ended up with the request, "Please, mother, won't you go to see her soon? I am sure you would do her good, and you always know exactly what to say."

"Do you think Stella would care to see me?" Mrs. Marston asked. "I should be sorry for her to think me intrusive."

"Oh, I am sure she would!" Katy cried, eagerly. "She was telling me only to-day how much she liked you, and how at home she always felt when she was with you. 'She is so motherly,' she said, and I know just what she means. Mrs. Lowe, I am sure, means to be very kind, but she has no children, and she somehow feels to chill you, while you—why, you're just *mother*, and that explains everything!"

Mrs. Marston kissed the flushed, eager little face and promised to do as Katy desired.

Accordingly, two days later she went to see Stella, carrying an offering from Katy of two newly laid eggs of her own special hen, over which she had placed the largest and darkest red rose she could find in the garden.

"I know she has everything she can possibly want," Katy said, "and far finer roses than any I could send her; but I want her to see I do not forget her."

Mrs. Marston was shown to the same room where Katy had last seen Stella; and, as before, the poor child was lying, listless and idle, looking out into the garden and absently caressing her favourite cat.

Mrs. Marston came forward with a bright, gentle greeting.

"I am so glad to find you are rather better to-day, my dear," she said, stooping down to bestow a warm, motherly kiss on the pale, wan little face.

Stella laughed in her old way—hard, cold, and joyless.

"I don't think that is much to be congratulated upon," she replied, ungraciously. "The very best news anyone could give me would be that I was growing worse every day, and could not possibly live long."

"Is not that rather a selfish wish, my dear?" Mrs. Marston asked, kindly, but without any of the horror and reproach in her tone which Stella half expected to hear. "If you do not want to live for yourself, think of all of us, and how ill we could spare you."

"Why, no one would care!" Stella cried, impetuously. "What earthly use can I ever be to anyone, unless," sneeringly, "it is to teach people to be patient? I am sure that mamma for one will need endless patience to bear having a daughter who is only a stupid, helpless cripple."

"Don't talk so, my child. Please God, there is plenty of happiness left for you yet, though it mayn't be of the kind you feel to want just now."

"Happiness!" echoed Stella; "I never can be happy again; never! never! That is all over and done with for me; but, oh! it

does seem so hard! And, think, I am not sixteen yet."

There was something in Mrs. Marston's look of tender pity and in her softly-murmured, "You poor darling," that won the girl's confidence, and led her to outpour all that was in her sad little heart—all the pent-up misery and rebellion and hopeless longings after the impossible, which her own mother would have had no patience to listen to nor power to sympathise with.

"I know I'm very wicked," the poor child finished up with. "I suppose, as Mrs. Lowe says, I ought never to think of repining, but be quite content as I am. But I don't think she would find it so easy to talk if she were in my place. I can't help it, Mrs. Marston, but I am quite desperate at times, and I feel as if I were going mad; and then I almost hate everybody else who is strong and well; and I hate the sun for shining, and I could kill the very birds for singing so happily when I am so utterly miserable. Oh! tell me how to bear it! Say something to comfort me!" she wailed.

Mrs. Marston made no reply for a moment beyond smoothing the bright hair and patting the thin white hand with a comforting little gesture. When she spoke her words sounded irrelevant to Stella. "Do you know my little baby Harold?" she asked. "He's hardly two years old yet, and, of course, being the youngest he is a great pet. Well, yesterday Katy brought him in from the garden crying a little, with a great thorn from the rose tree in his little finger. It was rather a bad wound for such a little fellow, and of course I had to take the thorn out for him, and of course that hurt him, and he cried and struggled hard to get away. I had to hold his little hand very tightly, for I knew that thorn must come out unless I wanted him to have a bad wound there. Do you suppose I gave up hurting him until I got the thorn out?"

"Why no, of course not," Stella answered, looking at her with wondering eyes.

"And you don't suppose I loved him any less because I hurt him? I should have been more likely to let him go and not take any trouble about his little finger if I had not cared for him at all; shouldn't I? And then when the thorn was out, and the little finger bound up, he was soon comforted, and went to sleep quite happily and free from pain on my knee."

"Yes," Stella answered, not seeing the drift of Mrs. Marston's words.

"He is a funny little fellow," her visitor went on; "when he was much smaller he used to cry for the fire, or the lamp, or candle; he wanted to play with them. Do you think I let him have them to play with, however sadly he cried?"

"No, of course not; he would only have burnt himself. But why do you tell me about him, Mrs. Marston?"

"Because, my dear child, I often think we are all like little ignorant children, never knowing what is best for us, or what will do us harm. And we seem as if we could not trust our Heavenly Father's love. We feel as if He must have made a mistake when He does not give us what we want, or we think He is cruel and unkind when He sends us trouble, and will not realise that the very trouble is only a proof of His love and care for us."

Stella saw the application of the words now, and a sweeter, softer expression stole over her face. She pondered over them in silence. She had no reply to make.

Mrs. Marston, too, was silent for a few minutes, and when she spoke again she changed the subject. She was not given to "preaching," as Stella would have called it. She was content to have sown a good seed and to leave it undisturbed.

So she produced her basket with Katy's little present, and began to chat lightly and pleasantly upon all manner of topics which she thought likely to interest the sick girl, and when she rose to go she met with a very earnest request from Stella to come and see her again very soon.

"You have done me *such* good," said the girl, gratefully; and she lay silently for long after her visitor had left, thinking deeply with a vague feeling of calm and rest and possible happiness filling her heart.

Those few words spoken by Mrs. Marston were not lost. They were as the good seed which brought forth a hundredfold. Stella was changed from that day.

Not that the alteration was altogether perceptible at first; we cannot change our natures in a moment. She was rebellious, selfish, and irritable many a time again; and yet there was a difference. Her eyes were beginning to be opened. She began to see herself as she really was, and to struggle, feebly and intermittently, to be better. It was a hard fight, and many a time in bitter discouragement she was tempted to give up the struggle. But Mrs. Marston was her true friend, always ready to help her with kind counsel and loving words; and Stella clung to her from that day with an affection of which Mrs. Branscombe grew almost jealous. There was no one like Mrs. Marston in Stella's eyes, and the squire's lady learned to look upon the quiet wife of the village doctor with a sort of wistful wonder where the charm lay that had won her daughter's love and confidence as she had never been able to do.

Nor did Katy forsake her sick friend. She had always been fond of Stella, though perhaps hitherto the affection between the two girls had not been very deep; but Stella's affliction and Stella's helplessness were a new bond between them, and appealed to all Katy's love and tenderness.

The two grew to be almost inseparable, and all Katy's spare time was spent in the sick room. Had she a new book, she must take it for Stella to read, that they might discuss it together afterwards. Had she learned a new sort of fancy work, she must go and show it to Stella and see if she cared to try her hand at it. There was always some excuse for running to the hall, and the squire and his lady even grew to look for her coming, for no one—unless it were her mother—cheered and brightened their daughter as Katy Marston did.

Ten years have passed away since then, and looking in once more upon the two girls—girls no longer—how do we find them?

Katy is Katy Marston no longer. Four years ago she married the assistant whom with increasing practice Dr. Marston found it necessary to engage, and who has since taken the doctor's place almost entirely, a small fortune which had come to him rendering the older man independent of his profession.

So Katy is a village doctor's wife, as her mother was before her. It is not a very grand position; Katy is never likely to become the great lady she had once longed to be. Their home is small; her husband is a hard-working man; but Katy thinks he is the grandest and noblest man that ever lived, and is heart happy in her devotion to him and to the two little girls who call her mother and who keep her brain and hands busy from morning to night.

And Stella, what of her?

Stella and her father live alone at the hall now, for it is three years since Mrs. Branscombe died, a disappointed, worldly-minded woman to the last. Her daughter's misfortune had embittered her strangely, and even when Stella had lived down the trouble and

grown to be far brighter, gayer, and sweeter than ever she had been before her affliction, her mother still mourned over it and refused to be comforted.

Not so the squire. When he saw his daughter happy once more he soon accommodated himself to circumstances.

"There is a bright side to everything, my dear," he would say when Stella alluded to her helplessness; "and it is a very great thing to me to know I shall always have you to stay with me. God knows I would have you well if I could, and yet——"

And Stella knew what the unuttered words meant, and kissed the hand which was touching her hair caressingly. The squire and his daughter were all in all to each other after poor Mrs. Branscombe's death. There was no more hunting for Stella, and the squire seemed to have lost his inclination to follow the hounds now that his daughter could no longer be at his side. So instead he would drive her out in her low easy carriage, with Dandy—grown an old horse now—between the shafts; and the villagers grew to know and to love the sight of the old man and their young lady, with her bright face and kindly interest in their concerns; her ready sympathy in their troubles and unflinching willingness to help.

"The sunshine of his life," her father would call her fondly; "the sunshine of the village," her poor neighbours would have echoed.

Could it be the same Stella? The gay, careless, self-centred girl of ten years ago? The same, and yet how different! She was happy and content in her apportioned lot, even when cut off from most of the pleasures in which youth delights; happier even than she had ever been in the heyday of her beauty and her girlhood. For she knew now what she had not known then, that purest and best of all pleasure—the giving of happiness to others.

But the present peace and sunshine had been purchased at the cost of many a hard struggle—many a dark day. Self is so hard to kill in the human heart, and many a time when we think it dead, we see it lifting its serpent head in places where it is least expected. But prayerful effort is sure in the end to be successful, and Stella gained the victory at last.

Her father's solace and joy; the lady bountiful of the village; the gentle, thoughtful mistress at home; Katy's bosom friend, and the fairy godmother to her two little ones. How could she help but be happy?

"It was just as you said, dear Mrs. Marston," she said one day to her faithful friend, "though I could not see it at the time; but I am sure my trouble was sent to me in love. Where should I have been if it had not been sent? Most likely a thoroughly worldly-minded woman, devoted to pleasure and fashion, for I know it was in me to be so. But I have been saved from that, and I see the love now. I don't mean I'm good"—with a soft little smile—"for I fear I never shall be that, but I'm always trying to be, and it is better to be always trying and always failing, than never trying at all. And I don't mean to say I don't sometimes wish I could be well and strong; but I am content to leave it all. I am sure my trouble has taught me to feel for others, and brought me out of myself; and I know—you have always told me so—that it will be made up to me some time. I fancy when I get to heaven"—and her tone was still more tender and reverent—"I shall be like the lame man who walked and leaped and praised God. And what a thing that is to look forward to! Yes, I am more than content. There is Katy, a happy, busy little house-mother, and here am I, a poor helpless sort of creature; but we are both trying to fill the place given us, like the daisy and the buttercup in the poem we used to be so fond of when we were girls; and how can we help being happy?"