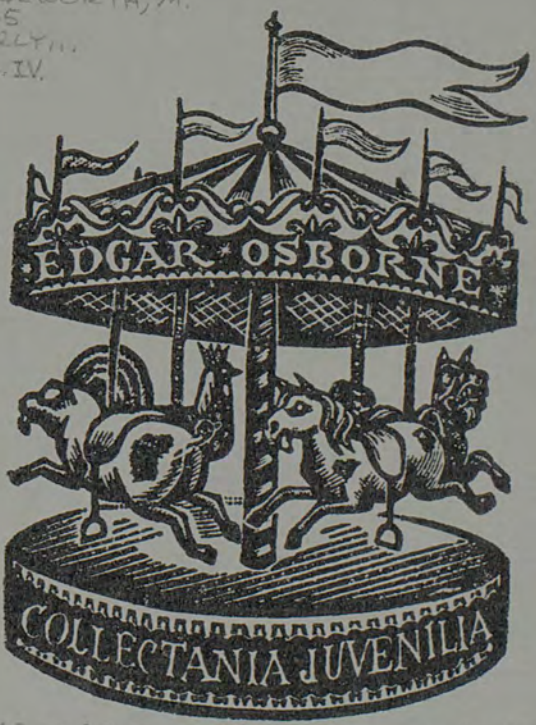

EARLY LESSONS.

IN FOUR VOLUMES.

BY MARIA EDGEWORTH.

VOL. IV.

CONTAINING THE CONTINUATION OF

ROSAMOND;

AND OF

HARRY AND LUCY.

THE TENTH EDITION.

" Cosi all' egro fanciul porgiamo aspersi
" Di soave licor gli orli del vaso;
" Succhi amari ingannato intanto ei beve
" E dall' inganno suo vita riceve."

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ROSAMOND

THE BEE AND THE COW.

"A GIRL, who mistook a bee for a cow! She must have been an idiot," cried Godfrey. "My dear Rosamond, there never could have been such a girl! This must be some great mistake of yours."

"Now, mamma, did not I hear that gentleman say so? Mamma, it is not a great mistake of mine, is it?" cried Rosamond.

"No, only a little mistake of yours, my dear Rosamond," answered her mother. "You did hear that gentleman telling me something about a girl, and a bee, and a cow; but you are not clear in the story."

"No; because of the cherries, which

distracted my attention, as you say, mamma. Will you be so good, ma'am, as to tell us the story, and then I shall know it clearly?"

"The fact was simply, that a lady was teaching a poor little girl, who had been constantly employed in a manufactory, to read. And, one day, this child was reading in a book, called Harry and Lucy, an account of a girl's being stung by a bee. The child read ill, and as if she did not in the least understand what she was reading—and the lady said to her, 'I think you do not understand what you are reading.' ——'No, madam, I do not.'——The lady questioned the child farther, and from her answers, began to think, that she had never seen a bee; and she asked the child whether she had ever seen a bee. The child answered, 'Yes, ma'am.' ——'What is a bee like?' said the lady. The child answered, 'Ma'am, it is like a cow.'"

Godfrey, Rosamond, and even the sage Laura, laughed at this strange answer; and they wondered how it was possible, that such an idea could come into the child's head.

"It was clear," Godfrey said, "that the child never had seen a bee;" but Laura did not think this was quite certain.

"The child," she observed, "might have seen a bee, without having been told the name of it."

Laura recollected to have heard her mother read, in the Monthly Magazine, a letter from a lady, who described the ignorance of some children, either in a manufactory or a charity school. It was said, that they did not know the names of a hog or a calf, when the animals were shown to them.

"But why did the girl, when she was asked what a bee was like, say, that it was like a cow?"

Godfrey and Rosamond thought, that the girl said a cow, only because she had nothing else to say; because it was the name of the animal that first occurred to her.

Laura thought, that there was some other reason for it. Her father said, he believed he had discovered the reason; and Godfrey immediately begged that he would not tell, but that he would leave to them the pleasure of guessing or inventing it.

"I would willingly, my dear," said his father, "but that I believe you do not know a certain fact, which is absolutely necessary to be known, Godfrey, before you could guess, or invent it.—Some children—particularly some of the poorer class—are taught their letters in *picture books*, as they call them, where, to each letter of the alphabet, a little *picture*, or, properly speaking, some print is joined, and the thing

represented usually begins with the letter to be taught; as, A, for *apple*, C, for *cat*. Now I remember to have seen, in some of these little books, B, for *bull;* and the letter B stands at the foot of the picture *of a bull*. It is a vulgar saying, meant to express that a person is ignorant—such a one does not know a B from a bull's foot. This saying led me to think of the cause of the child's mistake. And it appears to me, that the sound of the letter, which is pronounced like the name of the insect *bee*, was joined in the child's mind with the idea, or picture, of a bull or a cow. Therefore, when she was asked what a *bee* was like, the recollection of a cow came into her head."

Godfrey, with some difficulty, understood this, and allowed it to be possible Rosamond, who was eager to prove that the poor girl was not an idiot, compre-

hended her father's explanation quickly, and pronounced it to be very ingenious.

Still Godfrey maintained, that the child must have been uncommonly silly, to have made such a mistake. This assertion of Godfrey's led Rosamond and Laura to recollect, and to mention several odd instances of their own misunderstanding of things, when they were little children, which they had read or heard in conversation. Laura mentioned a passage in a story she once read, which appeared to her absolute nonsense; because it was ill stopped, or because, in reading it to herself, she had stopped in the wrong place. The sentence was this—

"'Leonora walked on, her head a little higher than usual;' which, by one method of reading it, may represent Leonora as walking on her own head, and consequently being a little higher than usual."

"However absurd this mistake may seem to us now," said Laura, "I assure you it was really made."

"And not by an idiot, nor by a very silly child, neither," said her mother.

Rosamond next reminded Godfrey of a mistake which he had made, but which he could now hardly believe, till both his sister and his mother joined in bearing witness, and in bringing the time and place to his mind.

"Godfrey, I remember perfectly," said Rosamond, "your telling me, you thought, that there were two worlds; and that America was in the other, and not in this world; that is, not on this earth—not on this globe. And you thought so, because America is called the new world, and all other countries the old world."

"It was a natural mistake for a child to make," said his mother; "and I dare say every child may recollect making a hundred such. Sometimes not till

after people have grown up, do they discover the sense of what they have learnt by rote, when they were children. I can recollect lines of poetry, which I was obliged to learn by rote, when I was a child, and which half my life afterwards I never understood."

"Thank goodness!" cried Rosamond —"Thank your goodness, mamma, we have none of us been forced to learn by rote poetry which we did not understand."

"But are you sure, my dear, that you have not, without being forced to do so, learnt by heart any poetry, that you do not understand?" said her mother.

Rosamond answered by beginning to repeat her favourite little poem.

THE ROBIN'S PETITION.

"When the leaves had forsaken the trees,
And the forests were chilly and bare;
When the brooks were beginning to freeze,
And the snow wavered fast through the air;

" A robin had fled from the wood,
To the snug habitation of man;
On the threshold the wanderer stood,
And thus his petition began:

" ' The snow's coming down very fast,
No shelter is found on the tree;
When you hear this unpitying blast,
I pray you take pity on me.

" ' The hips and the haws are all gone,
I can find neither berry nor sloe:
The ground is as hard as a stone,
And I'm almost buried in snow.

" ' My dear little nest, once so neat,
Is now empty, and ragged, and torn;
On some tree, should I now take my seat,
I'd be frozen quite fast before morn.

" ' Oh throw me a morsel of bread!
Take me in by the side of your fire:
And when I am warmed and fed,
I'll whistle without other hire.

" ' Till the sun be again shining bright,
And the snow is all gone, let me stay;
Oh, see what a terrible night!
I shall die if you drive me away!

" ' And when you come forth in the morn,
And are talking and walking around;
Oh, how will your bosom be torn,
When you see me lie dead on the ground!

" ' Then pity a poor little thing,
And throw me a part of your store;
I'll fly off in the first of the spring,
And never will trouble you more.' "

"I am sure I understand all this, mamma," said Rosamond; "and 'The poor Piedmontese and his Marmot.' "*

So far so good; but Rosamond went on to "Gray's Elegy in a Country Church-yard."

"Take care, Rosamond," said her mother; "you know I warned you, that you could not yet understand it, when you wanted to learn it by heart."

"But the lines sound so very pretty, and Laura has them all by heart."

"But I never learnt them by heart, till I understood them; and I never

* See Miss Lucy Aikin's Poetry for Children.

understood them, till they had been explained to me."

"I think I understand them well enough," said Rosamond.

"Begin, and let us hear," cried Godfrey.

"'The curfew tolls the knell of parting day.'"

"What is meant by 'curfew?'—What is meant by 'tolls?' and what is a knell? and what is meant by 'parting day?'"

"Godfrey, I cannot tell the meaning of every word; but I know the general meaning. It means that the day is going; that it is evening: that it is growing dark.—Now let me go on."

"Go on," said Godfrey, "and let us see what you will do when you come to 'the pomp of heraldry;' to 'the long drawn aisle and fretted vault;' to 'the village Hampden;' to 'some mute inglorious Milton;' and 'to some Cromwell, guiltless of his country's blood.'

—You! who have not come to Cromwell yet in the history of England!"———

"Well, I give it up," said Rosamond, overpowered with all these difficulties: "but, at least, I know the meaning of—

"'The swallow twitt'ring from the straw-built shed.'"

"Oh, I grant you the swallow," said Godfrey; "but not the 'cock's shrill *clarion*.'"

"It means the cock's crowing, which is like a clarion or trumpet."

"How came you to know that?"

"Because Laura told it to me."

"And now, Godfrey, you who have been so severe upon your sister, do you understand all the poetry you have learnt by heart?" said his father.

"Try me," said Godfrey.—He began with some lines from Pope's Homer, in Sarpedon's speech to Glaucus—

" ' Why on these shores are we with joy surveyed—
Admired as heroes, and as gods obeyed?' "

He went on to—

" ' Brave though we fall, and honoured if we live;
Or let us glory gain, or glory give.' "

And though he was a little perplexed to explain the last line, yet he convinced his judges that he understood it; that he was master of the sense, and felt the spirit of the whole speech. Elate with this success, he cast a look of triumph upon Rosamond, and began in an heroic tone—

" ' Ruin seize thee, ruthless king!
Confusion on thy banners wait;
Though fann'd by conquest's crimson wing,
They mock the air in idle state:
Helm nor hawberk's twisted mail,
Nor ev'n thy virtues, tyrant, shall avail.' "

" Gently, gently, my boy!—Tell us, Godfrey," said his father, " who is this ' ruthless king,' and why is ruin to seize him? and what are ' banners?' how were they ' fann'd by conquest's

crimson wing?' and what is 'helm or hawberk's twisted mail?' "

Fortunately for Godfrey, he had carefully read certain notes of Mason's to this poem; and he answered readily that "the ruthless king was Edward the First, who conquered Wales; and when he conquered Wales had put all the Welch bards, or poets, to death: that it was for this crime ruin was to seize him, though his banners, that is, the colours his soldiers carried in battle, were then victorious; 'fann'd by conquest's crimson wing,' was only another way of saying this, Godfrey observed. 'Hawberk's twisted mail,' he explained satisfactorily to be a kind of armour, made of rings of steel. Godfrey went on victoriously, showing that he knew all the kings of England and France, and all the facts in history alluded to in this poem. But presently, as he went on with the poem, he came to a passage,

where his historical notes gave him no assistance.—

"'No more I weep. They do not sleep;
On yonder cliffs, a grisly band,
I see them sit; they linger yet,
Avengers of their native land:
With me, in dreadful harmony they join,
And weave, with bloody hands, the tissue of thy line.'"

Godfrey could not make any sense of this passage; he did not know who wept—who slept—who the grisly band were—what dreadful harmony they joined, or what they wove with bloody hands.

Moreover, it now appeared that Godfrey did not clearly know whether the person, who had been speaking from the beginning of the poem till this moment, was the ghost of a bard, or the bard himself.

"Ha! ha!" said Rosamond. "Even Godfrey, you see, does not understand all the poetry he has by heart."

"Who does?" said her father, smiling.

"Laura does, I dare say," cried Rosamond.

"I dare not say so," said Laura.

"Do, pray, let us see," said Godfrey. —"Laura, what poetry do you know?"

"Very little," said Laura.—Conscious of the difficulty, she began with more timidity than her younger brother and sister had done. She repeated, first, from the Rape of the Lock, the parody of that speech of Sarpedon's, which Godfrey had recited, beginning with—

"Why round our coaches crowd the white glov'd beaux?"

ending with—

"And trust me, dears, good humour can prevail,
When airs, and flights, and screams, and scoldings fail;
Beauties in vain their pretty eyes may roll,
Charms strike the sight, but merit wins the soul."

These lines she well understood, but

she found it difficult to explain the nature of a parody. However, this difficulty was conquered; and her judges, even Godfrey, the most severe among them, admitted that she was not guilty of ever having learned any poetry by rote, which she did not understand; but Laura herself could not allow this to be true. She at once surprised them all, and made them laugh, by confessing, that, when first she learned by heart Collins's Ode to Evening, which begins with—

"If aught of oaten stop, or pastoral song,
May hope, chaste Eve, to soothe thy modest ear,"

she did not know the meaning of "pastoral song;" and she had thought, that "Eve" meant our first parent, instead of *evening*. At this strange mistake of Laura's, Godfrey laughed for some minutes. At last Rosamond turned with uncommon seriousness to her mother, and said—

"Mamma, now I am quite convinced

that it would be foolish in me to go on, getting all the poetry by rote, which I happen to hear other people repeat; for, if Laura does not understand it all, how can I?"

"Besides its being foolish to learn mere words, or merely pretty sounds by heart, Rosamond," said her father, "there is another reason why it will be better to put off learning poetry, till you can understand it; you will, if you read it before you have the necessary knowledge, lose a great pleasure, which you may enjoy if you wait till that time. I can give you an example of what I mean. I will repeat to you a few lines which describe something you have seen this day. I am not sure that you will understand them all; but I am sure that you will understand more of them to-day than you could have understood yesterday. Before you had seen, or had any knowledge of the machine that is

described, the lines could only have been nonsense to you, and could have given you no pleasure except, perhaps, that arising from their harmonious, or, as you say, Rosamond, their *pretty* sound."

He then repeated the following lines:

"With wiry teeth revolving cards release
The tangled knots, and smooth the ravell'd fleece:
Next moves the iron hand, with fingers fine,
Combs the wide card, and forms th' eternal line;
Slow, with soft lips, the whirling can acquires
The tender skein, and wraps in rising spires;
With quicken'd pace, successive rollers move,
And these retain, and those extend the rove:
Then fly the spoles, the rapid axles glow,
And slowly circumvolves the labouring wheel below."

"The Spinning-Jennies! the cotton machine, papa!" cried Rosamond; "I understand and like a great deal in these lines, and all I understand, I like."

Here Rosamond was interrupted by the postilion's stopping to ask which road they were to go.

THE HAPPY PARTY.

WHICH road should they go was the question.

They had come to a place where three roads branched off from the main road; each of these roads led to objects that the young people wished to see.—To an old castle, with a beautiful park; to a china manufactory; and to a town where there was a rope-walk.

Their father and mother said, that they would go whichever way Godfrey, Rosamond, and Laura should agree in preferring; and they gave the young people five minutes to decide, while their father was drawing a gate-way which was within view.—Godfrey immediately decided. "The rope-walk, then, the rope-walk! I vote for the rope-walk!—Rosamond, don't you?"

"No, indeed," said Rosamond; "I

would rather see the china manufactory, than all the ropes in the world—Would not you, Laura? My dear Laura, you will vote for the china manufactory, will not you?"

"For my own part," said Laura, "if I were to say what I wish for most myself, it would be to see the old castle, and to walk in the beautiful grounds, and to see the fine conservatory; but———"

Before Laura could say another word, Godfrey and Rosamond both interrupted, exclaiming, at the same moment——

"Conservatory! castle! park!—Is it possible, Laura, that you would rather see those foolish things than a rope-walk?—than a china manufactory?"

"I would," said Laura, smiling—"I confess, that I am so very foolish; but I do not call the rope-walk and china manufactory foolish things. On the

contrary, if you will settle between you, Godfrey and Rosamond, which you choose, I will give up my wish, and follow yours."

"O, that is very good-natured! thank you, Laura—thank you, dear Laura," said Rosamond; "you are always so ready to give up.—Now, Godfrey, what pleasure can you expect in seeing ropes, dirty ropes, all smelling of pitch and tar?"

"The way of making them is very ingenious; and ropes are much more useful than china," replied Godfrey. "What paltry things are china cups and saucers, compared with ropes!—The nation, the royal navy, could not exist without ropes,—consider, Rosamond!"

"I have nothing to do with the royal navy," said Rosamond; "but I want to know how china tea-cups and saucers are made; they are useful every day,

and twice a day, and you do not think them such paltry things at breakfast, or tea time, Godfrey—consider, too, Godfrey——"

"Consider, Rosamond," whispered Laura, "that my father has just finished his gateway, and the five minutes are almost over—look at the minute hand of the watch—three minutes and a half are gone; if we do not agree and decide, we shall not go to see any of these things."

"And, *instead of a party of pleasure*, Rosamond," added her mother, "*it may turn out a party of pain.*"

These words brought instantly to Rosamond's recollection the disagreeable day she had passed with the Masters and Miss Blissets, who had disputed about every trifle: she recollected, also, her own resolution never to imitate them: so, turning to her brother, she said, with a good-humoured smile—

"Well, Godfrey, Laura has given up her choice to please us, and I will give up my wish to please you, and we will all agree to go to the rope-walk."

"No, no, my dear Rosamond," said Godfrey; "no, no, my dear Laura, you shall not both give up your wishes to me; that would not be fair—let us draw lots."

"Here," said Godfrey, holding up three slips of paper, "draw one of these out of my hand, each of you; whoever has the longest, shall choose which way we shall go."

Laura drew the longest slip of paper; Godfrey and Rosamond smiled, and said she deserved it best, because she had been the most ready to yield.

"Laura has her wish, and we are both glad of it," said Rosamond; "and we agree, and are happy, mamma; we shall not dispute, like those foolish boys and girls, who turned pleasure into pain.

—I think, mamma, there is a sort of pleasant feeling in giving up, instead of disputing."

Her father smiled, and, holding out his hand to Rosamond, said

"That is right, my little girl—

'And trust me, dears, good humour can prevail,
When airs, and flights, and screams, and scoldings fail.'"

Rosamond was in such a good humour with herself, that she doubly enjoyed every thing she saw and heard.

"My dear Godfrey, look at those honeysuckles in the hedge! did you ever see such fine honeysuckles?—and did you hear that bird?—I do believe it was a nightingale."

"No, it was only a robin; but a robin, when people are inclined to be pleased, sounds sweeter than a nightingale, when people are not disposed to be satisfied."

"Now, Laura, we are come within

sight of the castle, look out of this window—here—you can see it best," said Rosamond—"and do you know, Godfrey, you will see a drawbridge, and hear a gong?"

"Indeed!" said Godfrey—"then I do not regret the rope-walk."

When they arrived at the inn, their mother ordered dinner to be got ready as soon as possible; and they dined as quickly as they could, that they might have the more time to walk, and see the castle. Dinner finished, they walked to the castle. Godfrey's object was to see the drawbridge, and hear the gong—Rosamond's to run up and down the terrace, and to discover where the walks led to in the grounds—Laura wished particularly to have time to see the conservatory—and their father and mother desired to look, while it was yet light enough, at the architecture of the castle, and at several fine pictures, which were

in some of the rooms. Now it was impossible that each person's wish could be gratified at the same moment, without their separating; but by each yielding a little, and all being desirous to accommodate and give pleasure to one another, the pleasures of all were secured and increased. First they looked at the outside of the castle: Godfrey and Rosamond had never before seen a Gothic castle. Their father told them what was meant by Gothic architecture: and, as they passed through a gallery of prints, he showed them prints of Grecian and Roman buildings. Then he left them, and went to look at the pictures. Rosamond and Godfrey were too young to have much taste for paintings; but instead of being impatient, till their father and mother had finished examining the pictures, they amused themselves by looking at some prints of celebrated persons, with which one gallery was hung.

Presently their father and mother returned to the gallery, where they had left Godfrey and Rosamond; and said, that they were now ready to go back with Godfrey to the drawbridge. His father added, that he would show him how it was constructed, and how it was moved. In going there, Rosamond had a fine run upon the terrace, and Godfrey took a race with her; she, in return, had the complaisance to stand quite still, and to attend when he wanted her to look at the drawbridge. Then they went on to Laura's object, the conservatory. Godfrey had no great wish to go; for he said he hated to look at ugly plants, with long hard names, upon which some people seemed to set a great value, he did not know why; however, as Laura wished to see this conservatory, he would go with her; and he would not laugh at her, or call the plants wretched weeds, because she had

been so good-natured to him, as to stay in the gallery of prints, on purpose to tell him the names and histories of some of the celebrated portraits. He knew that Laura, all that time, would rather have been with her father and mother, looking at the paintings.

They had a pleasant walk through the park to the conservatory. This conservatory was not filled with ugly looking plants, with long, hard names. Some of the flowers and shrubs were so beautiful, both in form and colour, that they charmed even Godfrey; and he found so many of which he wished to speak, that it became rather convenient to him to know their names; instead of calling one the great red flower, or the little blue flower, or the beautiful white *thing*. There were so many red, blue, and white flowers, that without a more particular description, no one could, with their best endeavours, understand which

he meant; and to describe the whole flower or shrub accurately, every time he wanted to speak of it, was rather troublesome.

In this conservatory there were several plants which Rosamond and Godfrey had never before seen, and which they had often wished that they could see.

"O Godfrey! here is the tea tree, and here is the coffee tree! look here, with its beautiful scarlet berries! and the sago tree, Godfrey!"

"But, Rosamond, come this way!—make haste, run!"—cried Godfrey.

Rosamond ran, but when she came opposite to the plant, to which her brother was pointing, she stood still, disappointed.

"I see nothing, brother, that is pretty"

"No, but you see something that is useful; or, at least, that was very use-

ful formerly. This is the papyrus, papa says, or *paper rush*."

"Very likely," said Rosamond; "but I see nothing like paper, nor like a rush."

"It is not like the little rushes you have seen in the fields, Rosamond; but papa told me, that it is a kind of rush, and it grew originally on the banks of the Nile, in Egypt, you know."

"Yes, I know the Nile is a river in Egypt."

"And the Egyptians used to write all their books upon it, and all that they wrote; because they had no such paper as we use now."

"Very likely," said Rosamond; "but I cannot imagine what part of it they wrote upon, or how they wrote upon it."

"Papa told me all about it, and I will explain it to you, my dear. Look at this stem of the plant—look; it is composed of thin leaves, as it were, one over the

other It was on these they wrote; of these, when unfolded, that they made their sort of paper; they cut off the top of the plant, and the root, which were of no use; and, with a sharp knife, they separated these leaves or rinds of the stem, and flattened them, and put one over the other, crosswise; so that one leaf lay breadthwise, and the other lengthwise; and stuck them together with the muddy water of the Nile, or with a sort of paste; and then the leaves were dried, and pressed with heavy weights; and sometimes they were polished by rubbing them with a smooth stone.

"Rub as they would," said Rosamond, "they could never make it into such nice paper as ours——they could not make it white."

"No; but it was better than none. The Romans used to write upon it a great while after the Egyptians."

"And how could they write with a pen and ink upon this leafy paper?"

"They wrote with a hard sort of pencil, that made marks on the papyrus."

In return for all this information about the papyrus tree, which Godfrey was proud to be able to give her, Rosamond, with equal eagerness, told him all she had heard from her mother about the tea tree. She told him that the leaves are rolled up over hot plates and dried; and the Chinese people fan the leaves, with large fans, whilst they are drying. Rosamond was surprised, she said, at the difference between the leaf of the tree and the tea, which she saw every day put into the tea-pot; but she recollected having seen the leaves unrolled and unfolded in the hot water; and she and Godfrey determined to look at them more particularly this very evening. Laura next took them to look at the coffee tree, and the cacao tree.

From the nuts of the cacao tree, she told them, both cocoa and chocolate are made; "and the berries of the coffee tree, when roasted, make the coffee, of which you are so fond, Godfrey."

Godfrey was glad to see the coffee tree, and proud to tell Rosamond something more that he knew, or rather that he had heard about coffee, "that monks used to drink it to keep themselves awake; and that they had learned the knowledge of the power which coffee has to keep people awake, from a goatherd, or keeper of goats, who had observed, that whenever his goats browzed upon the leaves of the coffee tree, they became unusually wakeful."

Laura was considering whether this was likely to be true or not; and she was just going to ask, whether it was certain, that the leaves of the coffee tree have the same effect as the berries have, but she forgot her doubts and

her question; for the master gardener, who had the care of the conservatory, came towards them, and began to talk to Godfrey. Finding that these young people were intelligent and eager to acquire knowledge, he was, as he said, ready to give them any information in his power. Rosamond asked him where the coffee tree came from first.

He answered, that some travellers say, that it was originally found in Abyssinia; but that he believed it was first brought into Europe from Arabia; that the Turks drank it commonly long before it was known in Europe; and that it was first brought into France by some French gentlemen, who had been to Constantinople.

"Constantinople! that, you know, is the capital of Turkey," whispered Godfrey to Rosamond.

"I know that very well," said Rosamond.—"But, sir, how long is it

since coffee was first brought to England?"

"In the time of Charles the Second, miss."

Rosamond had not yet got so far as the reign of Charles the Second, in the English history; but Godfrey had read it, and he told her that it was about one hundred and fifty years ago.

Her father, who heard what was saying, told Rosamond, that, about forty years after coffee was brought to England, some magistrates of Amsterdam——"

"Amsterdam! that is the capital of Holland," said Rosamond.

"Some magistrates of Amsterdam had some coffee plants from berries, which had been originally procured from Mocha, in Arabia Felix——"

"Mocha!" interrupted Godfrey, "that is the reason some coffee is called Mocha coffee."

Rosamond looked back at Laura, as much as to say, "I do not know where Mocha or Arabia Felix is."

Laura whispered, "I will show you where they are, on the map of Asia, when we go home."

"And these Dutch magistrates," continued her father, "sent a present of a fine coffee tree, in full bearing, that is, with ripe fruit upon it, as a present to Louis the Fourteenth."——

Rosamond looked puzzled again.

"Lewis the Fourteenth, king of France," said Godfrey.

"From the berries of this tree, other coffee trees grew; and about four years afterwards, several young coffee trees were sent from France to Martinico, one of the West India Islands. The voyage was long, and the weather not favourable, and all the plants died except one. The people in the ship were at last reduced to such distress, for want

of water, that each person had only a very small quantity allowed to them every day. The gentleman to whom the coffee tree had been entrusted, divided his share of water every day into two parts, and he drank but one half of his allowance himself, and gave the other to the tree of which he had the charge. The tree was saved; he brought the plant, which had been committed to his care, safely to Martinico, where it grew and flourished; and from this one plant that whole island, and afterwards all the neighbouring West India Islands, were supplied."

Rosamond was delighted with this man's care of the tree, which had been entrusted to him; but her pleasure in hearing what her father told her was a little lessened, by the shame she felt at being ignorant at several things, which Godfrey knew very well, and which he seemed to think she ought to know.

However, when he saw what she was thinking of, he in a good-natured manner drew her to another part of the greenhouse, and whispered to her—

"It is very easy to learn all that, Rosamond; and I have a nice *wee-wee* history of England and of France, that I bought with my grandmother's crown, on purpose for you. I have them in papa's coach seat, and you shall have them as soon as we get to the inn. I can tell you they are bound in red morocco, and not much larger than mamma's little red pocket almanack; and they have prints — a great many prints!" *

It was now growing late and dusk in the evening, and they had time only to look at the sensitive plant—the mimosa—which they saw close and droop its leaves, when they touched the latter,

* Pictures of England, designed by Alfred Miles, printed for J. Harris.

or even approached them with their fingers. Laura wished to have stayed a little longer with the mimosa; but she knew that if she did, there would not be time for Godfrey to hear the gong sounded, which he and Rosamond very much wished to hear. So Laura, ever ready to give up her own wishes, for the sake of giving pleasure to her brother and sister, left the conservatory, and walked as fast as she could back to the castle, with Godfrey and Rosamond, who thanked her half the way as they went, and pronounced that "she was one of the most good-natured sisters that ever was born."

They heard the gong, till all but Godfrey said they had had enough of the sound.

"Mamma," said Rosamond, "I am sure you are tired of hearing this loud noise.—Now, Godfrey, do not ask to have any more of it."

Godfrey stopped the hand of the man, who was going to strike the gong again.

"Mamma, how very different this party of pleasure has been from the *ill-humoured party*," said Rosamond: "we have all been good-humoured; have not we, mamma?—We have not disputed, nor wanted to have every thing our own way. I am sure, if those quarrelsome children—you know whom I mean, mamma—had been with us, they would have quarrelled about every trifle; and they would have spoiled the pleasure of seeing the castle, and the drawbridge, and the tea tree, and the cacao tree, and the coffee tree, and the gong, just as they spoiled the pleasure of going on the water, and hearing the music.—Ours has been really a party of pleasure, mamma.—A happy party!—Good night, mamma."

As Rosamond was going out of the room, she heard her father say to her

mother—" How easy it is to entertain children, who are good-tempered, and who have some taste for knowledge; and how difficult it is to make children happy, who are ill-humoured, and who have no taste for any thing but eating and drinking, and *idling:* with such children, it is impossible to have a happy party."

WONDERS.

"ROSAMOND, if you are sleepy, you had better go to bed," said her mother to Rosamond, who was yawning and stretching herself one morning soon after breakfast.

"To bed! mamma, at this time!—Oh no; I am not sleepy; I am only tired."

"Tired of what, Rosamond?"

"I do not know, really, ma'am, what makes me feel so very much tired, as I certainly do this morning. I suppose it must be my journey yesterday and the day before."

"But you were not tired last night, nor the day before yesterday, though you had been travelling, and walking, and running, and taking a great deal of exercise."

"That is true, ma'am.—But one does not feel tired, just at the time

always—sometimes one feels tired afterwards."

"How happens it, that Laura and I are not tired, nor your father, nor your brother? The journey was the same for all of us—Are you ill, Rosamond?"

"Not that I know of, mamma—Why should you think that I am ill?"

"Because you seem not able to do any thing. You have done nothing but lounge from window to window, from table to table, leaning on both your elbows, and yawning, this half hour."

"I suppose I must be ill—I do not know what is the matter with me, mamma—I am so very—very—"

"Lazy."

"No, not lazy, mamma."

"Idle, then."

"Because I have nothing to do, mamma."

"Have not you all your usual employments, Rosamond?"

"Employments, mamma!—What!—

You mean that I have not done my sum, or read French or English, or written. No, ma'am — but then I meant——"

"You meant, perhaps, that you have nothing that you like to do."

"That is just the thing, mamma."

"But you used to like all these employments, Rosamond."

"So I did, mamma, and so I do," added Rosamond, yawning again as she spoke.

"So it seems, Rosamond."

"I do really, ma'am—only just this morning—I do not like to set about to do any thing; and I do not know why every thing seems dull."

"Shall I tell you why, Rosamond?"

"If you please—if you can, mamma —and if you are not going to say that it is all my own fault."

"I am not going to say that it is all your fault, Rosamond — it is partly mine, and partly nobody's."

"Well! my dear mother, begin with the part that is nobody's fault, and then tell your part, and, last of all, mine, if you please."

"After having been unusually entertained and interested, it is natural, Rosamond, to every human creature, as well as to you, to feel as you do now—weary, you do not know why—not inclined to like your common employments—and unwilling to exert yourself."

"But this is no fault of mine, mamma, you say."

"The feeling is no fault, my dear; but not trying to conquer it would be a fault, and the punishment would be——"

"O, mamma, before we go to that, interrupted Rosamond, "tell me the next part, which you said was your fault."

"It was my fault, Rosamond, I believe, that I gave you too much entertainment for some days past. You had

so much amusement when you were at Mrs. Egerton's, and when you were travelling with us, that it has made home and your common employments seem dull and tiresome to you; and since I find this to be the case, I must take care not to let it happen again; for you know, my little daughter, I must not make you discontented with home, where you are to live; and I must not disgust you with your common employments, else you would never do or learn what is useful; and you would grow up a helpless, ignorant, wretched creature."

"Instead of growing up to be like Laura," said Rosamond.—"Mamma, I will not yawn any more, I will conquer my laziness, or idleness, whichever it is, and I will do something useful, as Laura does; and I know, mamma, that when I have done *my little duties*, as you call them, I shall feel better satis-

fied. I recollect my old *day of misfortunes*, mamma, when I was a little child—I remember how much better pleased I was after I had conquered myself—so no more yawning—Laura, will you mend a pen for me?—Mamma, will you set me a sum?—a difficult sum, you may, ma'am—Now for it in earnest!"

In earnest Rosamond set about her little duties, and in time accomplished them all, and enjoyed the satisfaction of having conquered her inclination to idleness, and of having earned her mother's and her own approbation.

It was a rainy day, and as Rosamond could not go out, Laura, with her usual good-nature, complied with her request to play at battledore and shuttlecock with her. But this could not last all day; before the morning was over, Rosamond began to feel some returns

of her old complaint, and another fit of yawning came on.

"Because, mamma," said she, "Godfrey has been so long at his Latin lessons, or in the workshop with his tools—May I go and see whether he can come now and swing me?"

"You may go, if you please, my dear; but you know that your brother said, that he would come as soon as he could."

Rosamond went, nevertheless, and returned with a disappointed countenance. "He cannot swing me yet, mamma—he has something to do first."

"I am sorry for it, my dear,—no—I mean, that I am sorry you have nothing to do."

"O mamma! if I had but the India cabinet here!—some of these curiosities, and wonderful things, and animals from other countries, then I should have amusement enough, this rainy day."

"Rosamond, though there is no India cabinet here, and no wonderful things from other countries, yet there are, even in this room, many curious things, and wonderful animals, with which you are not acquainted, which might afford you amusement enough this rainy day."

"Curious things! where are they, mamma?" said Rosamond, looking round—"there's nothing new in the room—nothing but what I have seen a hundred times—wonderful animals!—mamma, there is not an animal in the room, but you, and Laura, and myself."

"Look again, Rosamond."

Rosamond looked under the sofas, and under the tables and under her mother's gown, and under Laura's.

"Mamma, I have looked again, and there is no animal of any kind; not a dog, nor a cat, nor even a mouse, ma'am."

"And there are no animals but dogs, and cats, and mice?"

Rosamond saw Laura smile, and look towards the window.

"Ah, fly! Oh, I see what you mean now, mamma: a fly is an animal to be sure; but what is there wonderful in a fly?"

"There are more wonders in a fly's wing, a fly's eye, a fly's foot, little as you may think of a fly, Rosamond, than you could comprehend, or I explain in a whole day."

"Indeed, ma'am!" said Rosamond, looking at the fly with an incredulous countenance. Come upon my finger, fly," added she, going to the window, and holding her finger for the fly to walk upon—"There! walk upon my hand, and let me look at you."

"You may look at him, yet without seeing all the wonders I speak of, Rosamond."

"Why, mamma, how did other people see them? and have not I eyes, mamma, and good ones, as you sometimes say?"

"You have, my dear; but, however good they may be, they cannot see as much as eyes can with certain helps."

"Spectacles! mamma, do you mean? Do you know," said Rosamond, "I never could see well with spectacles in my life."

"Very likely, my dear; but I am not speaking or thinking of spectacles."

"What can you be thinking of, then, mamma?—O, what papa has in the study——A—a——What is it? for you know, Laura."

"A microscope do you mean?"

"Yes, a microscope, a solar microscope: I will run and ask papa this minute to lend it to me," cried Rosamond.

"Stay, Rosamond: he is busy, pro-

bably, and cannot give up his time to fix it for you."

"But papa is so very good!—I dare say he will, mamma, if he is not *terribly* busy—just let me run and ask him, mamma."

"Listen to me, and shut the door—there is not sunshine enough to-day for the solar microscope."

"Solar! ay, I remember Godfrey's telling me *solar* is *of or belonging to the sun.*"

"It is a pity it is a rainy day," continued Rosamond; "but a gleam of sun came out just now: perhaps it will peep out again."

"In the mean time," said Laura, "if you like it, I can show you, Rosamond, some of *the wonders of the microscope*, the pictures of some of the things and insects that have been seen magnified in a solar microscope."

"Yes, do, pray, Laura; you are al-

ways so good! and you know where every thing is."

Laura took down from its shelf a thin folio book.

"What book is it?—what is its name?"

"It is a long name, which, perhaps, you will not be able to pronounce; but though it has a hard name, the book is easy to understand," said Laura: "I used to love looking at it when I was your age, and I love it still."

"But what is its name?" said Rosamond, looking at the back. "Hook's Microg."

"The name is not all printed on the back; look at the title page," said Laura, "the first page, you know—here it is—I will read it for you—'Hook's Micrographia Restaurata; or, the copper plates of Dr. Hook's wonderful discoveries by the microscope *reprinted*——'"

"I don't care for that," interrupted Rosamond; "miss about *reprinted*—"

"'And fully explained.'"

"Ha! fully explained! I am glad of that, particularly if it is true," said Rosamond. "Now for the pictures."

"Prints they are—Here is the print of the sort of fly you were looking at just now—a bluebottle fly."

"But, my dear Laura! this cannot be meant for the picture of a fly, or print of a fly—for it is almost as large as a bird, as a robin—look, mamma!"

"The fly was magnified, that is, made to look large by the magnifying glasses in the microscope, in which it was seen," said her mother.

"But, ma'am, you have a magnifying glass, now I recollect—Will you lend it to me for one minute?"

Her mother unlocked her writing desk, lent Rosamond a magnifying

glass, and she immediately ran to the window and caught the fly.

"It won't stand still, ma'am, for me to look at him—there, now he is quite still—his wing; I see all the parts of it so plainly; and it is like thin gauze, or like the skeleton of a leaf, which I saw yesterday on the walk; or like——and his head and eyes——O, I saw his eyes ——But his head looks only about three times as large as his real head, ma'am—And the whole fly, now I see it altogether, seems only about three times as large as it is in reality—nothing like the size of the fly there in the book ——I am afraid the man who wrote that book, did not tell truth, Laura—— What do you think, mamma? What can be the reason, that I do not see this fly as large as he says he saw it with a magnifying glass?"

"My dear, you have not the same magnifying glass which he had." Her

mother then told her, that with different glasses objects appear of different sizes. Rosamond next wanted to know how it happens that one bit of glass, which looks much the same, she said, as another bit of glass, can have such different effects; and, in short, she wished to know how glasses magnify. — Her mother told her, that she could not explain this to her.

"Can papa, ma'am."

"Not till you know more than you do now, my dear."

"Then, for the present, I had better go on looking at these prints," said Rosamond, seating herself comfortably to examine them. She read the titles, as she turned over the leaves; and every now and then stopped to look at something that caught her attention in the descriptions of the prints—"'foot of a fly—three joints—little claws, which it clasps about things as it walks.' I

have often wondered how it walked on smooth glass. Mamma, it could not walk, if the glass was quite smooth; but there are bits of dirt and roughnesses on the glass, which we do not see, into which, or round which, it sticks its little talons. What comes next?—

"'Tufted, or brush-horned gnat.'—What a beautiful tuft he has on his head!—But, troublesome creature! how often he has teased me, when I have been going to sleep: and how he stings!"

Rosamond was silent for a minute, and then resumed—

"Mamma, do you know, this man says that he has four darts."

"Who! has four darts?"

"The gnat, ma'am, has four darts, in a kind of sheath under his throat, and he can push them out or draw them in, as he pleases—to sting us or not—barbed dart—Mamma, what is a *barbed* dart?"

Laura drew, for Rosamond, the shape of a barbed dart; and then she saw why it must hurt any one to draw it out.

Rosamond went on turning over the leaves.

"'Piece of a stinging nettle'—Mercy! what sharp spikes. Laura, my dear, do you know how a nettle stings? I can tell you—this man says, that there is a poisonous juice at the bottom of each spike, and that this is pressed out when we squeeze the spikes down.

"'Sting of a bee,'——Bag of poison, too, at bottom—same way—not quite ——'Wild oat beard; clothworm; wandering mite; cheese mite'——O cheese mite!—what a curious mite you are;——'poppy seeds; pansy seeds; moss; fine muslin; silk-worms—way to rear them'——O, delightful —— 'flakes of snow'——This Doctor Hook caught flakes of snow on a black hat, and watched their shape when melting

—I could do that on Godfrey's hat, as well as any doctor; and I will, the next time it snows——' hunting spider——' "

"My dear Rosamond, at the rate you go on you will have such a confusion of hunting spiders, flakes of snow, silk-worms, pansy seeds, cheese mites, stings of bees, stings of nettles, stings of gnats, and feet of flies, that you will know nothing, and remember nothing distinctly."

"True, mamma—One thing at a time, as papa says; so I will stick to the hunting spider——or, mamma, suppose —— the stings of bees, or cheese mites?"

"Whichever—whatever you please, my dear; but now let me read, and you read to yourself."

"Yes, mamma—only just this bit about the hunting spider. Ma'am, in the first place you must know, 'it is a

small gray spider, with spots of black over its whole body; which are found, by the microscope, to be made up of feathers like those on the wings of butterflies' —— feathers, mamma, on a spider's back!——'It runs sometimes very nimbly, and at other times jumps, like a grasshopper, and turns round so quickly, that it seems to face every way: it has six eyes; two in front, looking directly forwards; two by the side of these, pointing both forwards and sideways; and two others, on the middle of the back, which are the largest of all, and look backwards, and sideways: they are all black.'"

"Very well; now have you done, my dear Rosamond?"

"Oh, no, my dear ma'am: I was only just beginning—I was only telling you what sort of a creature this spider is, that you might know before I go on."

"But I have known all this a great while ago, my dear."

"But, mamma, you do not know what is coming—just listen one minute more, mamma. 'Mr. Evelyn'—you do not know Mr. Evelyn, do you, ma'am?—no—that is lucky. Well, 'Mr. Evelyn says, he observed a spider, at Rome, which, espying a fly, at three or four yards' distance, upon the balcony where he stood, would not make directly to her, but crawled underneath the rail, till, being got exactly against her, it would steal up, and, springing on her, seldom miss its aim. If the fly happened not to be within its leap, the spider would move towards her so softly, that the motion of the shadow on the dial is scarcely more imperceptible.'"

"You need not go to Rome to see all this, my dear Rosamond," said her mother; "you may if you observe——"

"Yes, ma'am," interrupted Rosamond; "but there is something more coming. May I go on, mamma?"

Her mother gave her leave to go on.

"You conquered your inclination to be idle, to-day, Rosamond; and, to reward you, I willingly give up a little time to hear you read, what you wish me to hear about this fly and the spider."

"Thank you, mamma." Rosamond went on instantly:—

"'If the fly moved, the spider would move also, in the same proportion, either forwards, or backwards, or on either side, without turning its body at all, keeping the same just time with the fly's motion as if the same soul animated the bodies of them both; but if the fly took wing, and pitched, upon some other place, behind the spider, it would whirl its body round with all imaginable swiftness, pointing its head at last towards the fly. Having got

near it by such indiscernible approaches, it would then make a leap, swift as lightning, upon the fly, and, catching him by the pole—

"The pole!—What is meant by the pole, mamma?"

"The head."

"'Never afterwards quits its hold, till'——poor fly!——the spider eats it up, ma'am; or, at least, 'eats as much as he can eat, and carries the rest home'——Ha! just what you told me, mamma," said Rosamond, as she turned over the leaf. "You told me I need not go to Rome, or to Mr. Evelyn, to see such things.

"'These spiders are to be found with us, on garden walls, in the spring, when the weather is very hot.'

"And here is an account of different sorts of spiders, that weave nets—make cobwebs——"

"Nay, nay, Rosamond, I did not un-

dertake to hear of all the different sorts of spiders," said her mother. "Now take the book away."

"Well, I will just finish it to you, Laura, my dear," said Rosamond, carrying the great book to Laura; and, leaning it on her shoulder, she went on reading—

"'Spiders that make webs ——' Laura, do you know that cobwebs are made of a gummy liquor, that comes out of the spider's body, which *adheres* (that means *sticks*, does not it?) to anything it is pressed against, and, being drawn out, hardens instantly in the air, becoming a string, or thread, strong enough to bear five or six times the spider's body, and yet of an amazing fineness?"

"How curious!—How entertaining this is," said Rosamond. "Mamma might well tell me that, though we have no *India cabinet*, I might find curious

and wonderful things enough, even in the commonest little insects, *spiders* and flies, ants and bees—and the commonest vegetables, too; the nettle you recollect —and mould—Look at this picture of mould: it is like mushrooms—even mould, such as I saw to-day, on the paste we threw away, Laura, appears to me now as wonderful as anything I saw in the India cabinet."

Here Rosamond was interrupted in her speech by the entrance of her brother Godfrey, who came to summon her to the swing.

THE MICROSCOPE.

ONE fine morning, Rosamond had a difficult, or what appeared to her a difficult, sum in division to do. She had made a mistake in it, and had just wiped away a tear, and rubbed out half what she called *a long ladder of figures*, when she heard Godfrey's voice at the window, calling to her—

"Rosamond! Rosamond, come out! Come here!"

She ran to the window, and saw Godfrey with a green helmet of rushes on his head, holding another in his hand, on the top of a spear; and he had a bow and arrow slung across his shoulders.

"Come, Rosamond, come directly; here is your helmet, that I have made for you; and here's a bow and arrow for you; I am to be Aurelian, the

Roman emperor, and you shall be Zenobia, queen of the east."

"Yes," said Rosamond; "when I have done my sum in division."

"When you have done what? I don't hear you."

Rosamond held up her slate, to show him what she was about.

"O, is that the thing? Have not you done your sum yet? How can you be so long doing your sum?"

"Very easily," said Rosamond, sorrowfully; "because it is a very difficult sum."

"Difficult!—Nonsense; I do sums ten times as difficult every day. I am sure I could do it in five minutes."

"I dare say you could," said Rosamond, sighing; "but, you know, you are so much older."

"Well, make haste," said Godfrey; "you'll find me on the field of battle at the bottom of the hill."

"Very well—the nines in forty-nine will go how many times?" said Rosamond, to herself, trying to withdraw her attention from the sight of Godfrey, who was running down the hill, brandishing his spear. Suddenly he turned about, and came back to the window.

"Rosamond, pray, did mamma desire you to finish that sum before you went out?"

"No: she did not quite desire it; but I believe I ought to do it."

"But, if she did not *desire* it, come out, and you can finish the sum afterwards."

"When?"

"Any time in the day. Surely, in the course of the day, you can find time to do it."

"But, if I once go out with you, and begin being Zenobia, queen of the east, I shall forget ever to come in to finish my sum——No—I will stay and finish it now."

"That is right, Rosamond," said Laura, who was at the other end of the room; but who now came to the window to Rosamond's assistance. "You will soon have finished it, Rosamond; then you will have done all you ought to do, and then you can be queen of the east, as long as you please."

"In peace and comfort," said Rosamond. "The nines in forty-nine will go———"

"Are you still at the nines in forty-nine?" cried Godfrey.

"Yes; because you interrupted her," said Laura.

"Will you come or will you not, Rosamond?" said Godfrey.

Rosamond looked at Laura; then at the helmet; and then at Laura again.

"No, brother; I will do this first: because I ought."

"That's right, Rosamond," said Laura.

The emperor of the Romans whistled

and walked away. Rosamond was afraid that he was angry with her; but Laura, who saw what passed in her thoughts, said—

"Never mind that, my dear Rosamond; you are in the right."

Rosamond fixed her attention, with difficulty, upon her slate; answered the question she had asked herself so often, about the nines in forty-nine; and completed the sum in long division.

"Now, all is right, I hope," said she.

Laura looked at it, and Rosamond watched her face.

"I know by your smile, Laura, that all is right," said Rosamond.

"Quite right," said Laura.

Scarcely had the words passed Laura's lips, when Rosamond seized her bonnet, threw open the glass door, which led to the lawn, and ran down the hill to the field of battle.

How happy she was, as queen of the

east, with her helmet of rushes, and her bow of sallow, is not to be told, but may be guessed, by her continuing two whole hours untired of the war, with the still more indefatigable emperor of Rome. At last, as they halted for a moment, breathless, their lengthened shadows reminded them of the time of day; and now, as the emperor had been severely wounded, in searching among the brambles for his last arrow, and the queen of the east was likewise hopeless of hers, which had been shot into the long grass, a truce was agreed upon for this day: they hung their bows under the beech tree, laid aside their helmets, resumed the hat and bonnet, and Godfrey and Rosamond were themselves again.

In the mean time, at home new pleasures were preparing for Rosamond. Laura, having given her mother a full and true account of Rosamond's heroic

resolution, to finish her long sum in division, in spite of all temptations to the contrary; her mother was pleased to have this opportunity of bestowing upon her a mark of approbation. When Rosamond went into her room to dress, she found lying on her table, two little books, in which her name was written.

"'On the Microscope,' my dear Laura!—The very thing I wished for, when I heard mamma read the title in the newspaper, the other day; and the very thing Godfrey wished for."

The moment she was dressed—and she was dressed this day with singular expedition—she ran to thank her mother for the books, and then to show them to Godfrey.

Godfrey opened the first volume and read—

"'Microscope described; its uses; magnifying glasses; discoveries made by'——I shall like, I believe, to read

this."—Then turning to another chapter —"'Principle of the telescope; refraction; limits of distinct vision; principle of concave lenses explained.'*

"But, my dear Rosamond, did my mother give this to you? You can no more understand this than you can fly."

"I know that, brother," replied Rosamond, looking a little mortified; "but mamma did give *me* the books, and she told me where to begin—here, at 'poppy seeds' and 'the blessed thistle,' which I can understand, as well as any body; and whatever I do not understand, I need not read yet—Look at these prints; here are all my old friends, the spiders, and beetles, and caterpillars, and gnats."

"So I see," said Godfrey; "and while you are busy with those in the second volume, you can lend me the

* Dialogues on the Microscope, by the Rev. J. Joyce.

first, because I shall begin at the beginning, for I can understand about the laws of vision and refraction."

"Do not be too sure of that," said Rosamond, nodding her head; "for I can tell you, mamma said she was not sure that even *you* could understand all *that* without a great deal of help and explanation from papa."

"We shall see," said Godfrey.

He sat down and began at the beginning, whilst Rosamond looked first at the prints of the spiders and caterpillars.

"But, Godfrey," resumed she, after being silent a few minutes, "I forgot to tell you, why mamma gave me these nice books. It was because I stayed, with so much resolution, to do my DUTY this morning—to finish my long sum, instead of going out with you, first, to be queen of the east."

"'RESOLUTION! DUTY!'" repeated

Godfrey. "What a fine emphasis, Rosamond! as if it was such a grand duty —such a great exploit!"

"Grand or not, it was my duty, and I did it," said Rosamond; "and Laura and mamma said I was right, and I know I was right."

"I do not say you were wrong, but I do not see the great resolution."

"No, not *great* resolution, may be; but great for me, for a little girl, like me."

"That makes a difference, to be sure," said Godfrey. "Well! I grant you *great* for *you*."

Not quite satisfied with Godfrey's manner of granting this, Rosamond could not refrain from praising herself a little more—Half talking to herself, she went on—

"Mamma, I know, says—and Laura says, too—that I am learning to have a great deal of resolution, and prudence,

too; for now I always—almost always—think as mamma advises, and as Laura does, of the future; and I always, that is, generally, prefer the great future pleasure, to the little present pleasure."

"You would give me a little present pleasure, if you would hold your tongue, Rosamond," said Godfrey.

The dinner bell rang at this moment, just when Rosamond's colour was rising, and when the words, "Godfrey, you are very provoking," were going to be said. They were not said, and Rosamond was glad of it; she resolved not to be provoked—A wise resolution, in which a good dinner, as Godfrey observed, much strengthened her.

In the course of the evening, however, something led to a renewal of the conversation. Laura was in the room, when the dispute began; but she was playing on the piano forte, and singing: so that she did not hear what was going

on. Presently, Rosamond came and stood at her elbow, silent and still. As soon as she had finished the lesson she was playing, Laura began the accompaniment of

"Merrily every bosom boundeth,
Merrily, oh!——merrily, oh!"

"Come, Rosamond, we can sing this together—Begin."

But Rosamond could not begin—she was in no condition for singing—she could not command her voice—she struggled, and struggled in vain, and at last burst into tears. Laura, surprised, stopped playing.

"What is the matter, my dear Rosamond?" said she.

"Oh!——Because——because," said Rosamond, sobbing, "because Godfrey says, that it is all selfishness——"

Laura wiped the tears from Rosamond's eyes, and waited till her sobs and

indignation would allow her to give a clearer account of the matter.

"He says——He thinks——that all my prudence is selfishness."

"No, no," cried Godfrey; "I only said—Where's the generosity, Rosamond?"

"Yes; but you said, that all that about giving up a present pleasure, Godfrey, for a greater future pleasure was not generous."

"Well, so I did; and I say it again—Where's the generosity, Rosamond, of choosing for yourself the greatest of two pleasures?—You can't call that generous."

"There now!—Do you hear *that*, Laura?" said Rosamond, and her tears recommenced.

"I hear it," said Laura; "but I do not know why it should make you cry so, my dear Rosamond."

"I only know it does make me——

make me——make me very——very unhappy; because, if mamma tells me one thing is right, and Godfreys tells me another, I don't know what is right, and what is wrong, and I don't know what to do: for I thought it was right to be prudent, and mamma said so; and now Godfrey says it is not generous."

"But don't cry so, Rosamond," said Laura; "he did not say *you* are not generous, did he?"

"He did not say that, quite; but he said, that, if I go on so, he thinks I shall become selfish."

"And so I do," said Godfrey.

"If she goes on how, Godfrey?" said Laura.

"If she goes on always, as she has learnt to do lately, considering, and calculating only how she is to secure, upon every occasion, the greatest quantity of pleasure; in short, how she is to make herself the happiest—I say, that may

be very prudent, but it is not generous —it is all selfishness."

"There!—there!—Now do you hear him?" cried Rosamond.

"But we will all try, and ought to try, to make ourselves as happy as we can, without hurting any body else," said Laura coolly—"You may say, that the wisest and best person in the world is selfish, at that rate. And the most generous persons have pleasure, I suppose, in being generous—it makes them happy, or they would not be generous; so far, they look forward to their own pleasure. But if you call this being *selfish*, it is only making a wrong use of the word."

"Oh! that is very fine," said Godfrey; "but we all know what is meant by generosity; and people that are generous, are never calculating and weighing about their own happiness—they are ready to give up their own pleasures to

others. And I repeat it," added he, partly, perhaps, for the pleasure of teazing Rosamond, and partly for the sake of persisting in his first assertion—"if Rosamond goes on, as she is going on now, I think she *will* become selfish."

Godfrey was called away at this moment by his father.

"He is not in earnest, I am sure," said Laura, as he left the room; "he is only trying your temper, Rosamond."

"It is so unjust!" said Rosamond. "Selfish! —— He forgets about the India cabinet, for instance; that I put off, for three long days, the little present pleasure of seeing it by myself, for the greater pleasure of seeing it afterwards, with him and you——was that selfish ——was that selfishness?"

"No, indeed, it was not," said Laura; "but I am glad you did not put him in mind of that, just now—One should

never reproach any body with any kind thing we have done for them."

"No, I did not mean to reproach, but only to put him in mind—to convince him, you know."

"Better wait till another time," said Laura.

"But, Laura, you don't think, then, that I am *going the way* to become selfish?"

"No, indeed, my dear Rosamond, I do not, said Laura; for the more you practise, even in the least things, the sort of resolution you showed this morning, the more, I think, you would have resolution to be really generous: that is, to give up your own pleasures for other people."

"You think so!——I am so glad *you* think so," said Rosamond, wiping away her tears; "and, perhaps," continued she, her whole face brightening as she spoke, "perhaps, Laura, some time or

other I shall make Godfrey think so too."

"I dare say you will," said Laura; "Godfrey is very candid, and he has amused himself with trying your temper; yet, when he is convinced he is wrong, I am sure he will acknowledge it."

"O Laura! you are what mamma calls you—*the peacemaker*," said Rosamond. "Now I am ready to sing with you,

'Merrily every bosom boundeth.'"

It was not long before Rosamond had an opportunity of convincing her brother Godfrey, that she was not in any danger of becoming selfish; and that her practising prudence had not diminished her desire to be generous, but, on the contrary, had increased her resolution to make those sacrifices of present to future pleasure, without which no one can be really generous.

Godfrey, after reading the account of

the microscope, in Rosamond's little book, was seized with an ardent desire to have a microscope of his own. His father had a small pocket microscope in a case, which usually stood upon the mantel-piece in his study. This was exactly the sort of thing for which Godfrey wished.

One day, when he had been examining it for some time in silence, his father said that he would give him this microscope, if Godfrey would do a laborious job, which he much wanted to have done immediately.

"O father, what is it," cried Godfrey—"I will do it with pleasure."

"And I shall give it to you to do with pleasure," said his father; "because it will not only save me some trouble, but do you some good—it will improve your handwriting, and, perhaps, it may increase your habits of order and patience."

"But what is it, sir?" said Godfrey.

"It will, perhaps, cost you a week's hard labour," said his father.

"I hope I shall be able to bear it, sir," replied Godfrey, laughing—"But pray tell me what it is, father."

"Did you see the two large packing cases?"

"Which came down this morning, for you, by the waggon?—Yes; and I wondered what was in them."

"Your uncle's library, which must be unpacked, and put up in the new book-cases, in my study."

"And is this the job I am to do? I am glad of it. I shall like to do it very much," said Godfrey.

"But you are to write a catalogue; an alphabetical catalogue of all the books; and arrange them under the heads history, poetry, miscellaneous, according to the titles of the book-cases."

The writing the catalogue was a task

which Godfrey did not much like, for he had not yet learned to write quickly and well.

"May I have anybody to help me, sir?"

"Yes, your sisters, Laura and Rosamond, if you can persuade them to help you: no one else."

It proved a more laborious and tedious undertaking than Godfrey had foreseen. He applied to Laura and Rosamond for assistance. And it was now that Rosamond had an opportunity of showing him her readiness to give up her own pleasure to serve him. Every day, for a whole week—and a week is a long time at Rosamond's age—she worked hard, reading the names of the books to him, as he was making his catalogue; then arranging the volumes ready for Laura, and at last carrying them for Laura and Godfrey to put up.—Hard, tiresome work! And it was fine

weather, and her father and mother took pleasant walks every evening, and Rosamond loved to walk with them: but every evening, when her mother asked if Rosamond would come with them, or stay to help her brother, she chose to stay to help her brother.

Godfrey said nothing, but he felt a good deal—he felt how unjust he had been; and he loved Rosamond for never reproaching him, and for showing such good temper, as well as generosity. The catalogue was at last finished; the books were arranged on their shelves. Godfrey announced to his father that he had completed his undertaking, and presented to him the catalogue. His father examined it, saw that it was well done, and put the microscope into Godfrey's hands, telling him that he had well earned it, and that he was glad he had so soon accomplished his business.

"Father, I should not have finished

it this month—I think I should never have got through it—without the help of Laura and Rosamond——"

"And, Rosamond," said he, turning to her with tears in his eyes, which he tried to prevent from coming into them, but could not; "I am sure you have done more for me than I deserved. I acknowledge I was unjust, and you are not selfish."

"O Laura," cried Rosamond, "do you hear that?"

"And if you forgive me, Rosamond, will you accept, from me, of this microscope?"

"No, Godfrey, I cannot," said Rosamond, putting both her hands behind her. "I don't mean, that I cannot forgive you, for that I do with all my heart, and did long ago; but I cannot take the microscope."

HARRY AND LUCY.

BY

RICHARD LOVELL EDGEWORTH

AND

MARIA EDGEWORTH.

La philosophie a des discours pour la naissance des hommes comme pour la décrépitude. Prenez les simples discours de la philosophie ; sachez les choisir et traiter à point, ils sont plus aisés à concevoir qu'un conte de Boccace. Un enfant en est capable au partir de la nourrice, beaucoup mieux que d'apprendre à lire ou à écrire.

TO PARENTS.

We are afraid that the following pages should appear too difficult for children of eight or ten years old, if their thoughts have not been turned to subjects of the sort which are here introduced to their attention. We, therefore, most earnestly deprecate the use of the following book, till the understandings of the pupils into whose hands it may be put, shall have been previously accustomed to the terms, and to the objects, which are mentioned in the following part of this little volume.

The intention of the writers is to prepare the mind for more difficult studies; and the end which they have in view will be completely frustrated, if this little book is *crammed* into the minds of children. It is intended to be used in very short portions, and not to be formed into necessary tasks; but to be read when the child's mind has been prepared, by what it has already seen and heard, to wish to hear and see more.

That these *lessons* (not *tasks*) are in themselves intelligible to children, we are certain; because they have been readily comprehended by several young children, and in particular by a boy of four years and two months old. All the experiments herein related were shown to him at different times, within a fortnight. He was much entertained. His lessons were short, but his

attention was engaged, and he seemed to wish for their return with eagerness. That he did, and does, understand them thoroughly, and that he has not been taught certain answers to certain questions by rote, we assert. In making this assertion, we do not mean to claim any superiority for this child over other children; because we believe him to be no prodigy, but a child of good abilities, without any peculiar cleverness. So far from making any such claim, we must acknowledge, that this boy scarcely knows his letters; and, that he shows no extraordinary quickness in learning them. He is, however, lively, and obedient; indeed, the most lively children are, if well treated, usually the most obedient. The names of various objects, of common and of uncommon use, are familiar to him; he has seen a variety of tools, and has been accustomed to handle a few of them. In short, in his education, nothing extraordinary has been said, or taught, or done. Every governess, and every mother who acts as governess to her own children, may easily follow the same course. Where mothers have not time, and where they cannot obtain the assistance of a governess, it were to be wished, that early schools could be found for early education. To learn to read is to acquire a key to knowledge; but, alas! it is a key that is not always used to advantage. There is not an hour in the day when something useful may not be taught, before books can be read or understood.

Perhaps parents may pity the father and mother, in Harry and Lucy, as much as they

pity the children; and may consider them as the most hard worked, and hard working people that ever existed, or that were ever fabled to exist. They may say, that these children never had a moment's respite, and that the poor father and mother had never anything to do, or never did anything, but attend to these children, answer their questions, and provide for their instruction or amusement. This view of what is expected from parents may alarm many, even of those who have much zeal and ability in education. But we beseech them not to take this false alarm. Even if they were actually to do all that the father and mother of Harry and Lucy are here represented to have done, they would not, in practice, feel it so very laborious, or find that it takes up so preposterous a portion of their lives as they might apprehend. In fact, however, there is no necessity for parents doing all this in any given time, though there was a necessity for the authors' bringing into a small compass, in a reasonable number of pages, a certain portion of knowledge.

Be it therefore hereby declared, and be it now and henceforward understood, by all those whom it may concern, that fathers or mothers (*as the case may be*) are not expected to devote the whole of their days, or even two hours out of the four and twenty, to the tuition or instruction of their children.—That no father is expected, like Harry's father to devote an hour before breakfast to the trying of experiments for his children.—That no mother is required to suspend

her toilette—no father to delay shaving—while their children blow bubbles, or inquire into the construction of bellows, wind-mill, barometer, or pump. And be it further understood, that no mother is required, like Lucy's mother, to read or find every evening entertaining books, or passages from books, for her children.

Provided always, that said fathers and mothers do, at any and all convenient times, introduce or suggest, or cause to be introduced or suggested to their pupils, the simple elementary notions of science contained in the following pages; and provided always, that they do at all times associate, or cause to be associated, pleasure in the minds of their children with the acquisition of knowledge.

RICHARD LOVELL EDGEWORTH
AND
MARIA EDGEWORTH.

Dec. 8, 1813.

HARRY AND LUCY.

It was Lucy's business to waken her father every morning. She watched the clock, and, when it was the right time, she used to go softly into her father's room, and to open the curtain of his bed and to call to him—

"Papa! papa! It is time for you to get up."

Then she drew back the window curtains, and opened the shutters—and she put every thing ready for him to dress. She liked to do this for her father, and he liked that she should do it for him; because the attending upon him taught her to be neat and orderly. She and her brother Harry both liked to be in the room with their father, when he was dressing; because then he had leisure to talk to them. Every morning he

used to tell or teach them something that they did not know before.

One morning at the beginning of winter, when the weather was cold, Lucy said—

"It is much colder, in this room, to-day, papa, than it was when you got up yesterday."

"O no! I think it is not nearly so cold to-day, as it was yesterday, when my father was dressing," said Harry, "What do you think, papa?"

Their father went and looked at *something* that hung in his window, and then answered—

"I think that it is neither hotter nor colder, in this room, to-day than it was yesterday, at the time when I was dressing."

"Are you sure, papa?" said Lucy.

"Quite sure, my dear."

"How can you be quite sure, papa?" said Lucy—"How do you know?"

"I can tell how papa knows," cried Harry—"He looked at the thermometer."

"But how does he know by looking at the thermometer?" said Lucy.

"Come here, and I will show you, for I know," cried Harry. "Stand up on this chair beside me, and I will show you; my uncle told me all about it last summer, when I was looking at the thermometer at his house."

"Look, do you see this glass tube?"

"Yes; I have seen that very often."

"I know *that;* but do you see this part of the tube, at the top, seems to be empty; and this part of it here, at the bottom, and half-way up the glass tube, is full of something white—Do you know what that is?"

"Yes; I remember very well, my uncle told me, that is quicksilver; but what then?"

"Stay, be patient, or I cannot explain

it to you. Do you see these little marks, these divisions marked upon the edge here, upon the ivory, by the side of the glass tube?"

"Yes; well?"

"And, do you see these words printed?"

"Yes; *freezing, temperate, blood-heat, boiling-water heat*—I have read those words very often, but I don't know what they mean."

"When it is neither very hot nor very cold, people say, it is *temperate;* and then the quicksilver would be just opposite to that division where temperate is written. When it freezes, the quicksilver would be down here, at the *freezing point;* and if this thermometer were put into boiling water, the quicksilver would rise up, and it would be just at the place where *boiling water* is written. *Blood-heat,* I believe, means the heat that people's blood is of gene-

rally—I am not sure about that.—But look, here are the numbers of the degrees of heat or cold. Boiling-water heat is 212 degrees; and when it is freezing it is 32 degrees.

"And the heat of the room now is ——Look, what is it, Lucy?"

Lucy said it was above the long line marked 40.

"Count how many of the little divisions above 40," said Harry.

She counted, and said seven; and her father told her to add that number to 40, which made 47.

Then Lucy asked how her father had known that it was as cold, and no colder, in his room to-day, than it was yesterday morning.

"Because, yesterday morning, the quicksilver rose just to the same place, to 47 degrees, as it does to-day. It always rises or falls, with the same degree of heat or cold,

to the same place—to the same degree."

"But look, look, it is moving! The quicksilver is rising higher and higher, in the glass!" cried Lucy. "Look! now it is at fifty—fifty-two—fifty-five."

"Yes: do you know the reason of that?" said Harry.

"No; I do not know," said Lucy; "for it is not in the least warmer now in this room, I think, than it was when we first looked at the thermometer."

"That is true; but you have done something, Lucy, to the thermometer, that has made the quicksilver rise."

"I!—What have I done?—I have not even touched it!"

"But you have put your face close to it, and your warm breath has warmed the glass. Now look, when I put my hand, which I have just warmed at the fire, upon the bottom of the thermometer—upon this little round

ball, or bulb, where the greatest part of the quicksilver is—look, how it rises in the tube! and now I will carry the thermometer near the fire, and you will see how much more the quicksilver will rise."

Lucy looked at it, and she saw that the quicksilver rose in the thermometer, when it was brought near to the fire.

As Harry was putting it still closer to the fire, his father called to him, and begged that he would take care not to break the thermometer.

"O yes, papa, I will take care. If you will give me leave, now I will put it into this kettle of water, which is on the fire, and see whether the water is boiling or not. If it is boiling, the quicksilver will rise to *boiling water heat*, will it not?—I will hold the thermometer by the string at the top, so I shall not burn my fingers."

His father stood by, while Harry tried

this experiment; and Lucy saw that, when the water boiled, the quicksilver rose to *boiling water heat;* that is, to 212 degrees.

Then Harry carried the thermometer back again to the window, and left it to cool for some minutes; and they saw that the quicksilver fell to the place where it had been when they first looked at the thermometer this morning: that is to say, to 47 degrees.

"Now, you see," said Harry, "the use of the thermometer. It shows exactly how hot or how cold it is."

"It measures the degrees of heat," said their father, "and the name *thermometer* means measurer of heat, from two Greek words; *thermo* means heat, *meter* means measure, as you may observe in the words baro*meter*, pyro*meter*, hygro*meter*, and many others."

"But why, papa, does the quicksilver rise in the tube when it is hot and fall

when it is cold? I do not understand why," said Lucy.

"That is a sensible question," said her father; "and I am not sure that I can answer it so as to make you understand me. It has been found, from experience, my dear, that quicksilver *expands*—that is, *spreads out—takes up more room*—when it is heated, than when it is cold; and it always expands equally when it is in the same heat. So that, by knowing how much more room it takes up, for instance, when it was held near the fire, than it did when it was hanging at the window, we could know how much greater the heat is near the fire than at the window——Do you understand me, Lucy, my dear?"

"Yes, papa,—I think I do. You say, that, when the quicksilver is heated, it ———I forget the word———"

"*Expands*," cried Harry.

"Yes, *expands*—When quicksilver is heated, it *expands*, papa."

"But what do you mean by *expands*, my little girl?"

"It spreads out every way——its size increases——it takes up more room."

"Very well——And what then?"

"Why, then———as it expands when it is heated, people can tell, by seeing or measuring the size of the quicksilver, how hot it is."

"True—But how do you think they know exactly how much it increases in size or *bulk*, when it is heated to different degrees of heat?—How do they measure and see at once the measure of this?"

"With a pair of compasses, papa," said Lucy.

"Look at this little ball or globe of quicksilver," said her father, pointing to a little ball of quicksilver in the glass, at the bottom of the thermometer. "Would it not be difficult to measure this with a pair of compasses, every time you apply heat to it?"

"That would be difficult, to be sure," said Lucy.

"There must be some other way—Some way, too, that it can be measured without taking the quicksilver out of the glass every time."

"I know the way!" cried Harry——

"Don't speak—don't tell her—let your sister think, and find out for herself. And now I must shave; and do not either of you talk to me, till I have done."

Whilst her father was shaving, Lucy looked at the thermometer, and considered about it; and she observed, that the thin, tall line, or column of quicksilver, in the little glass tube, rose from the bulb, or globe of quicksilver, at the bottom of the thermometer—and, when she put her warm hand upon this bulb, the quicksilver rose in the tube.

"I know it now!" cried Lucy. "But

I must not tell it, till papa has done shaving, lest I should make him cut himself."

As soon as papa had done shaving, Lucy, who had stood patiently at his elbow, stretched out her hand, and put the thermometer before his eyes.

"Here, papa! now I will show you."

"Not so near, my dear—do not put it so close to my eyes; for I cannot see it, when it is held very near to me," said her father.

"There, papa, you can see it now," said Lucy, "cannot you? and you see the quicksilver, in this little glass globe, at the bottom of the thermometer?"

"Yes, I see it," said her father.

"When it is heated, and when it expands," continued Lucy, "it must have more room, and it cannot get out at the bottom, or sides, or any way but up this little glass tube. There is an opening, you see, from the uppermost

part of that little globe, into this glass tube."

"Very well," said her father—"Go on, my dear."

"And, when the quicksilver is made hot, and hotter, it rises higher, and higher, in this tube, because it wants more and more room; and the height it rises to shows how hot it is, because that is just the measure of how much the quicksilver has expanded—has grown larger. And by the words, that are written here—and by these little lines—these degrees, I believe, you call them—you can know, and tell people exactly, how much the quicksilver rises or falls—and *that* shows *how hot* it is."

"Pretty well explained, Lucy—I think you understand it."

"But one thing she does not know," said Harry, "that in making a thermometer, the air must be first driven out of the little tube, and the glass must

be quite closed at both ends, so as to keep out the air. My uncle told me this—and now, papa," continued Harry, "will you tell me something about the barometer—I know that it is not the same as the thermometer; but I do not know the difference—Papa, will you explain it to me?"

"Not now. You have had quite enough for this morning, and so have I. I must make haste and finish dressing, and go to breakfast."

"Yes; for mamma is ready, I am sure," cried Lucy. "Here are your boots, papa."

"And here is your coat," said Harry.

"Papa, to-morrow morning, will you let us blow bubbles, when you have done shaving?" said Lucy.

"No, no; I want to hear about the barometer to-morrow," said Harry.

"We will settle this when to-morrow

comes; and now let us go to breakfast," said their father.

At breakfast, as their father was looking at the newspaper, he found an advertisement, which he read aloud. It said, that a man had brought an elephant to a town in the neighbourhood, which he would show to any persons, who would pay a shilling a-piece for seeing it; and that the elephant was to be seen every day, for a week, between the hours of twelve and three.

Harry and Lucy wished very much to see an elephant; they said, that they would rather see it than any other animal, because they had heard and read many curious anecdotes of elephants. Their father said, that he would take them, this morning, to the neighbouring town, to see this elephant. Harry immediately went for his "*Sandford and Merton*," and Lucy jumped from her

chair, and ran for her "*Instinct displayed.*" And they each found in these books, anecdotes, or stories of elephants, which they were eager to read to their father and mother. Lucy had not quite finished breakfast; so Harry began first; and he read the history of the tailor, who pricked the elephant's trunk with his needle; and he read of the manner in which the elephant punished him. And he read the account of the enraged elephant, who, when his driver's child was thrown in his path, stopped short, in the midst of his fury; and, instead of trampling upon the infant, or hurting him, looked at him seemingly with compassion, grew calm, and suffered himself to be led, without opposition, to his stable.

When Harry had finished reading, Lucy said, that she liked these stories of the elephant; but that she had read that part of Sandford and Mer-

ton so often that she had it almost by heart.

"But now," said she, "I will read you something, that will, I hope, be quite new, even to papa and mamma—unless they have read *my* Mrs. Wakefield's 'Instinct displayed.'"

Then Lucy read an account of Rayoba's favourite elephants, who were almost starved by their keepers, before it was discovered how their keepers cheated them of their food. When the prince saw that his elephants grew thin and weak, he appointed persons to see them fed every day; and these people saw the keepers give the elephants the food, of which they were most fond, rich balls, called *massaulla*, composed of spices, sugar, and butter, &c. The elephants took these balls up in their trunks, and put them into their mouths, in the presence of the persons who were to see them fed; but still the elephants,

though they seemed to eat so much every day, continued thin and weak.

"At length the cheat was discovered: "and it shows the extraordinary influ- "ence the keepers had obtained over "these docile animals. They had taught "them, in the inspector's presence, to "receive the balls, and to put them into "their mouths, with their trunk, but to "abstain from eating them; and these "tractable creatures actually had that "command over themselves, that they "received this food, of which they are "so remarkably fond, and placed it in "their mouths, but never chewed it; "and the balls remained untouched, "until the *inspectors*" (that is, the people who had been appointed to see them fed) "withdrew. The elephants "then took them out carefully, with "their trunks, and presented them to the "keepers; accepting such a share only "as they were pleased to allow them."

Lucy rejoiced at finding that this curious anecdote was new to her brother, and even to her father and mother. After they had talked about it for some time, and had admired the docility of these poor elephants, Lucy told what she had read of another elephant, who used to gather mangoes for his master, and to come every morning to his master's tent when he was at breakfast, and wait for a bit of sugar candy. Lucy's mother then desired her to bring from the library table the book, which she had been reading yesterday evening—"*Mrs. Graham's Account of her Residence in India.*"—When Lucy had brought the book, her mother showed her an account of an elephant, who had saved the life of an officer, who fell under the wheel of a carriage; and a description of the manner in which elephants are tamed: and she told Lucy, that she and Harry, if they chose it, might read

these passages. They liked particularly to read, at this time, accounts of this animal, that they might know as much as they could of his history, before their father should take them to see the elephant. They were happy, reading together what their mother had given them leave to read of this book; and then they looked over the prints; and, by the time they had done this, their mother called Lucy to her dressing-room, to write and to cast up sums, and Harry went to his father's study to learn his Latin lesson. Harry and Lucy regularly employed themselves for about an hour, every morning after breakfast; and, in general, they attended entirely to what they were doing, while they were learning whatever they had to learn—therefore they learned well and quickly. Lucy was learning to write, and she wrote about two lines carefully every day; always trying to mend, each

day, faults of which her mother had told her the preceding day. She was also learning arithmetic; and she could, with the help of a dictionary, make out the meaning of half a page of French, every day, without being much tired. She knew that nothing can be learned without taking some trouble; but when she succeeded in doing better and better, this made her feel pleased with herself, and paid her for the pains she took. She now read English so well, that it was a pleasure to her to read; and to her mother it was a pleasure to hear her. So the reading English was always kept for the last of her morning's employments. She was, at this time, reading such parts of "*Evenings at Home*," as she could understand. This day she read the "Transmigrations of Indur;" and after she had read this in "Evenings at Home," her mother let her read a little poem, on

the same subject, which was written by a young gentleman, a relation of hers. Lucy particularly liked the following description of the *metamorphosis*, or *change*, of the bee into an elephant—

" Now the lithe trunk, that sipp'd the wood-
land rose,
" With strange increase, a huge proboscis grows;
" His downy legs, his feather-cinctured thighs,
" Swell to the elephant's enormous size.
" Before its tusks the bending forests yield;
" Beneath his footstep shakes th' astonish'd field;
" With eastern majesty he moves along;
" Joins in unwieldly sport the monster throng.
" Roaming regardless of the cultured soil,
" The wanton herd destroy a nation's toil.
" In swarms the peasants crowd, a clam'rous band,
" Raise the fierce shout, and snatch the flaming
brand;
" Loud tramp the scared invaders o'er the plain,
" And reach the covert of their woods again."

By the time Lucy had finished reading, and that she had worked a little, and had copied the outline of a foot and of a hand, her mother told her to

put by all her books, work, and drawings, and to get ready to go out; for it was now the hour when her father had said, that he should take Lucy and her brother to see the elephant.

HARRY and Lucy walked with their father to the neighbouring town, which was about a mile and a half distant from their home; they went, by pleasant paths, across the fields. It was frosty weather, so the paths were hard; and the children had fine running and jumping, and they made themselves warm all over. When she was very warm, Lucy said—

"Feel my hand, papa; I am sure, if I was to take the thermometer in my hand now, the quicksilver would rise finely——How high, papa?—to how many degrees do you think it would rise?"

"I think," answered her father, "to about seventy degrees of Fahrenheit's thermometer."

"Fahrenheit's thermometer! Why do you call it Fahrenheit's thermometer? I thought it was your thermometer, papa?" said Lucy.

"So it is, my dear; that is, it belongs to me; but it is called Fahrenheit's, because a person of that name first divided the scale of the thermometer in the manner in which you saw that of mine divided. There are other thermometers, divided in a different manner; some of these are called Reaumur's thermometers, because they were first divided so by a person of the name of Reaumur."

"But, papa, will you tell me," said Harry, "something about the barometer?"

His father stopped him. "I cannot tell you any thing about that, now, my dear: run on, or we shall not have time to see the elephant; for the keeper of the elephant shows him only till three o'clock each day." Harry and Lucy ran

on, as fast as they could, and they were quite in time to see the elephant.

They were surprised at the first sight of this animal. Though they had read descriptions, and had seen prints of elephants, yet they had not formed an exact idea of the reality. Lucy said that the elephant appeared much larger; Harry said it was smaller than what he had expected to see. Lucy said, that, till she saw it, she had no idea of the colour, or of the wrinkled appearance of the elephant's skin. The keeper of this elephant ordered him to pick up a little bit of money, which he held upon the palm of his hand. Immediately the obedient animal picked it up, with the end of his proboscis, and gave it to his keeper. Lucy said, she had never had a clear notion how it moved its trunk, or proboscis, nor how it could pick up such small things with it, till she saw it done. Harry said, that he had never

had an idea of the size or shape of the elephant's feet, till he saw them. Lucy said, the prints had given her no idea of the size of its ears, or of the breadth of its back. Both she and her brother agreed, that it is useful and agreeable to see real things and live animals, as well as to read or hear descriptions of them.

The keeper of this elephant was a little weak-looking man. Harry and Lucy admired the obedience and gentleness of this powerful animal, who did whatever his master desired, though sometimes it appeared to be inconvenient and painful to it to obey. For instance, when the elephant was ordered to lie down he bent his foreknees and knelt on them; though it seemed to be difficult and disagreeable to it to put itself into this posture, and to rise again from its knees. Lucy asked what this elephant lived upon, and how much he ate

every day. The man said that he fed the elephant with rice and with vegetables, and he showed a bucket, which he said held several quarts—this bucketful the elephant ate every day. There was in one corner of the room a heap of raw carrots, of which, the keeper said, the elephant was fond: he held a carrot to the animal, who took it gently and ate it. When Lucy saw how gently the elephant took the carrot, she wished to give it one, with her own hand; and the man told her that she might. But when Lucy saw the elephant's great trunk turning toward the carrot which she held out to him, she was frightened; she twitched back her hand, and pulled the carrot away from the elephant just as he was going to take it. This disappointment made him very angry; and he showed his displeasure by blowing air through his proboscis, with a sort of snorting noise, which frightened

Lucy. Harry, who was more courageous, and who was proud to show his courage, took the carrot, marched up to the elephant, and gave it to him. The animal was pacified directly, and gently took the carrot with his proboscis, turned back the proboscis, and put the carrot into his mouth. Harry, turning to his father, with a look of some self-satisfaction, said, that "the great Roman "general, Fabricius, was certainly a "very brave man, not to have been "terrified by the dreadful noise made by "King Pyrrhus's elephant, especially as "Fabricius had never seen an elephant "before." Lucy did not know what Harry *alluded to*, or what he meant; because she had not yet read the Roman history. He said, that he would show her the passage, in the Roman history, as soon as they were at home. And now, having looked at the elephant as long as they wished to look at him,

and having asked all the questions they wanted to ask, they went away; they were glad to get out into the fresh air again, for the stable in which the elephant lived had a very disagreeable smell. Lucy pitied this animal, for being kept *cooped* up, as she said, in such a small room, instead of being allowed to go about and to enjoy his liberty. Harry then thought of horses, who live shut up a great part of their lives in stables. He asked his father, whether he thought that horses, which have been tamed, or *broke in*, as it is called, and which are kept in stables and taken care of by men, are happier or less happy, than wild horses. His father said, he thought this must depend upon the manner in which the horses are fed and treated: he observed, that if horses, which are tamed by man, are constantly well fed, and are protected from the inclemencies of the

weather, and are only worked with moderation, it is probable that they are happy; because in these circumstances they are usually in good health, and fat, and their skins look sleek, smooth, and shining. From these signs, we may guess that they are happy; but as they cannot speak, and tell us what they feel, we cannot be certain.

During the walk home, Harry and Lucy took notice of many things. There was scarcely an hour in their lives, in which they did not observe and learn something. One subject of observation and of conversation led to another; but it is impossible to give an account of *all* these things.

When they got home, Lucy reminded her brother of his promise about Fabricius and the elephant: he showed her the passage in the Roman history, which he had read; and that evening Lucy asked her mother, if she might

read the whole of her brother's Roman history. Her mother gave her a little History of Rome,* with sixty-four prints in it; and she told Lucy, that when she knew all the facts, told in this history, it would be time enough to read another, which might tell her more particulars of the Roman history.

THE next day being Sunday, Harry and Lucy went, with their father and mother, to church. The morning lesson for this day was one of the chapters of the Bible, which contain the history of Joseph and his brethren. Harry and Lucy listened attentively; and when they came home from church, they told their father, that they wished, very much, to know the end of that history, of which they had heard the beginning read by the clergyman, at church. Their father took down, from

* Probably Mrs. Trimmer's.

his book-case, the large family Bible, and he read the whole of the history of Joseph and his brethren, with which the children were very much interested and touched.

In the evening, they each read to their mother one of Mrs. Barbauld's "Hymns in Prose for Children." Harry and Lucy loved these hymns, and they showed their mother the passages that they liked particularly in those which they read this day.

"Mamma, this is the passage which I like the best," said Lucy—

"'Look at the thorns, that are white with blossoms, and the flowers that cover the fields, and the plants, that are trodden in the green path: the hand of man hath not planted them; the sower hath not scattered the seeds from his hand, nor the gardener digged a place for them with his spade.

"'Some grow on steep rocks, where

no man can climb: in shaking bogs, and deep forests, and desert islands; they spring up everywhere, and cover the bosom of the whole earth.

"'Who causeth them to grow every where, and * * * * * * * * * * * * * and giveth them colours and smells, and spreadeth out their thin transparent leaves?

"'How doth the rose draw its crimson from the dark brown earth, or the lily its shining white? How can a small seed contain a plant? * * * * *

"'Lo! these are a part of his works, and a little portion of his wonders.

"'There is little need that I should tell you of God, for every thing speaks of him.'"

Harry was silent for a moment, after he had heard these passages read again, and then he said—

"I like that very much, indeed, Lucy; but now let me read to you, mamma, what I like better still

"'Negro woman, who sittest pining in captivity, and weepest over thy sick child; though no one seeth thee, God seeth thee; though no one pitieth thee, God pitieth thee: raise thy voice, forlorn and abandoned one, call upon him, from amidst thy bonds, for assuredly he will hear thee.

"'Monarch, that rulest over a hundred states, whose frown is terrible as death, and whose armies cover the land, boast not thyself, as though there were none above thee——God is above thee; his powerful arm is always over thee! and, if thou doest ill, assuredly he will punish thee.'"

THE next morning, when Harry and Lucy went into their father's room, Harry drew back the curtain of his father's bed, and said—

"Father, you promised to tell me something about the barometer, and it is time to get up."

His father answered without opening his eyes—

"Do you see two tobacco pipes?"

Harry and Lucy laughed: for they thought that their father was dreaming of tobacco pipes, and talking of them in his sleep. Lucy recollected, that her mother said, he had been writing letters late the night before, and she said to her brother—

"We had better let him sleep a little longer."

"Yes, do, my dear," said her father in a sleepy voice; and take the two tobacco pipes, and my soap, and my basin, and the hot water, Lucy, that you brought for my shaving, and you may blow soap bubbles, in the next room, for half an hour; and, at the end of that time, come and waken me again."

Harry looked about the room, and he found on his father's table the two

tobacco pipes, which he had been so good as to put there the night before. Taking care to move softly, and not to make any noise, that should disturb their father, they carried out of the room with them the hot water, basin, soap, and tobacco pipes. During the next half hour, they were so happy, blowing bubbles, watching them swell and mount in the air, and float, and burst, trying which could blow the largest bubbles, or the bubbles which would last the longest, that the half hour was gone, before they thought that a quarter of an hour had passed. But Lucy heard the clock strike, and immediately she knew, that the half hour was over, and that it was time to go and waken her father again. So she went directly, for she was very punctual. Her father was now awake, and he got up; and, while he was getting up, she began to talk to him of the pretty soap

bubbles, which they had been blowing: but Harry was impatient to ask his father something about the barometer.

"Now, Lucy, let us have done with the soap bubbles," said Harry, "I want to learn something seriously—papa, I want to understand the barometer perfectly, before I go, next week, to my uncle's, that he may find I am not so ignorant as I was the last time he saw me; and, besides, my cousin Frederick will be at home, and he is only a year or two older than I am; and my uncle says, that Frederick understands the use of all the instruments in his room—but I did not understand even the barometer—father, will you explain it to me this morning?"

"Just let me first show papa this one large bubble," said Lucy, "and then you may go to the barometer."

Lucy blew a large bubble, from the end of her tobacco pipe; but it burst

before it had risen far. Then Lucy put by the tobacco pipe, and said—

"Now I will not interrupt you any more with my bubbles."

"But, perhaps, my dear Lucy," said her father, "the bubbles may lead us to the knowledge of some things necessary to be known, before I can explain a barometer. Do you know what a bubble is?"

"O yes, papa," said she; "I remember you told me, a great while ago, ——a bubble is"——

She was forced to pause, to think, however, before she could describe it.

"I believe it is air, blown into a round case, or globe of *something*—a soap bubble is air in a round case of soap and water—but, papa, I have often seen bubbles on the top of water; *they* are only air and water. But how can the case be made of water? I can conceive, that a globe of soap and water

might stick together, because I know, that soap is sticky; but I wonder at water's sticking together, so as to make a hollow globe."

"When you look at water," said her father, "or at quicksilver, you perceive that they are very different, not only in colour, but in their other properties."

"*Properties*, papa," said Lucy—"that is a word of which you taught me the meaning—properties are what belong to things."

"One of the properties of water is *fluidity*," said her father—"sand, on the contrary, is not fluid. Sand may be poured out, like water or quicksilver; but the grains, of which it is composed, are separate, and have no visible attraction for each other. The parts of water *cohere*, or stick together, but slightly; a small force divides them; but still they have an obvious tenacity."

"Papa! what is *obvious tenacity*?—

Tenacity, I know, is stickiness—but what does *obvious* mean?"

"Easily seen—plain—easy to be perceived: by obvious tenacity I mean tenacity which you can easily perceive; though nothing viscid, or sticky, is added to the water, you see that water can be spread by air, so as to form the outer case of a bubble."

"But when soap is added to water," said Lucy, "larger bubbles can be made."

"Yes—Why?"

"Because the soap makes the parts of the water stick together more strongly—but, papa," continued Lucy, "what is the reason that a bubble bursts? for if the outside case is strong enough to hold it at first, why should not *that* hold it as well always? yet at last it bursts—what is the reason of this?"

Her father said, that he believed

there were several causes, which might make a bubble burst; and that he was not sure, either that he knew all of them, or that he could explain them all, so as to make Lucy understand them. He mentioned some of the causes; for instance, the wind blowing against the bubble might break it; or the heat might expand the air withinside of it, and burst it; or, at other times, some of the water, of which the outer skin of the bubble is made, may run down from the top to the bottom, till it makes the bottom so heavy, and the top so thin, that it bursts."

Here Harry was heard to utter a deep sigh. His father smiled and said—

'Poor Harry thinks we shall never get to the barometer; but have patience, my boy, we have not gone so far out of the way as you think we have. Now, Harry, run to my workshop and bring me a bladder, which you will find hang-

ing up near the door. And, Lucy, run for the little pair of bellows, which is in your mother's dressing room."

Harry brought the bladder, and Lucy brought the bellows. They were curious to see, what their father was going to show them; but, just then, the breakfast bell rang. Their father could not show or tell them any thing more, that morning, for he was forced to finish dressing himself as fast as he could, and the children helped him eagerly. One reason why they liked to come to their father every morning, and to be taught by him, was, that he never tired them by forcing them to attend for a long time together.

Ten minutes at a time he thought quite sufficient, at their age; but then he required complete attention. Whenever he found that they were not thinking of what he was teaching them, he would not say any more to them—he

sent them away. For this they were always sorry; and this *punishment*, or rather this *privation*, was sufficient to make them attend better next day. It very seldom happened that they were sent out of their father's room. Though he never taught them *in play*, as it is called, yet he made what they learned as interesting to them as he could; and he made work and play come one after the other, so as to refresh them. He and their mother took care that Harry and Lucy should neither be made to dislike knowledge, by having tiresome, long tasks, nor rendered idle, and unable to command their attention, by having too much amusement. Spoiled children are never happy. Between breakfast and dinner, they ask a hundred times, "What o'clock is it?" and wish for the time when dinner will be ready, or when pudding or apple-pie will come. And when dinner

is over they long for tea-time, and so on. Or they *must* have somebody to amuse them, or some new toys. From morning till night they never know what to do with themselves: but the whole long day they are lounging about, and troublesome to every body, continually wishing, or asking, or crying, for something, that they have not—Poor miserable creatures!—Children who are not spoiled, will smile, when they read this; and will be glad, that they are not like these, but that they are like Harry and Lucy. Harry and Lucy loved pudding and apple-pie, as well as most people do; but eating was not their only, or their greatest pleasure. Having acquired a love for reading, and for knowledge of many sorts, they found continually a number of employments, and of objects, which entertained and interested them. So that they were never in want of new

toys, or of somebody to amuse them. If any extraordinary amusement was given to them, such, for instance, as their seeing an elephant, they enjoyed it as much as possible; but, in general, Harry and Lucy felt that they wanted nothing beyond their common, every-day occupations. Besides their own occupations and amusements, there was always something going on in the house, which entertained them; they were now able to understand their father and mother's conversation: living constantly with them (*and not with servants*), they *sympathized*, that is, *felt along with* their parents, and made, to a certain degree, a part of their society. Frequently their mother read aloud in the evenings—Harry and Lucy were never *desired* to listen; but sometimes they could understand what was read, and sometimes they found it entertaining.

It happened, one winter evening, that their mother began to read a French book, which they could not understand, yet it seemed to amuse their father so much, that they wished to know what it was about. All that they heard their father and mother saying to one another about it, made them sure that it must be entertaining; they left their map of Europe, which they had been putting together, and Lucy went and looked over her mother's shoulder at the book, and Harry leant on his elbows opposite to his mother, listening eagerly to try if he could make out any meaning; but he could understand only a word, or a short sentence, now and then.

Their mother observed their eagerness to know what she was reading, and she was so good as to translate for them, and to read to them in English the passages which she thought most entertaining. She told them first what it was about.

It was the account given by a traveller, of a high mountain, in Switzerland, and of the manner of living of the people by whom it is inhabited. Harry and Lucy turned to the map of Europe, which they had been putting together, and pointed to Switzerland as their mother spoke. The name of the mountain, of which she was reading an account, was Mount *Pilate*. The name was taken, as their father told them, from the Latin word *Pileus*, a hat, the top of this mountain being almost always covered with what looks like a hat, or cap of clouds. Different points, or heights, of this mountain, are called by different names. The most curious, difficult, and dangerous part of the ascent lies between the point called the *Ass*, and another part called *the Shaking Stone*.

"O mother! read about the shaking stone," cried Harry.

"No, Harry, let mamma begin here, where there is something about *de tres belles fraises*. I know the English of that, *very fine strawberries*."

Her mother began to read just where Lucy's finger pointed—

"'At the bottom of this road, up to the shaking stone, is a bank, which is covered with very fine strawberries, from the middle of the summer till the 21st of December, if the snow does not cover them before that time. And they may be found, even under the snow, if people will take the trouble to look for them.

"'All the fir trees near this spot are called *storm shelterers;* because they seem to have been placed there on purpose to shelter people from the storms. Some of them afford a shelter of fifty feet in circumference. The rain cannot penetrate through the thick branches of these trees. The cattle are often seen

gathered together under them, even in the finest weather; but it generally happens that a storm comes on, within a quarter of an hour after the cattle have taken shelter in this manner.' "

"How do the cows, or horses, foresee the storm, mamma?" said Lucy.

"I do not know, my dear."

"Let my mother go on reading, and ask all your questions afterwards, Lucy," said Harry.

"If I can but remember them," said Lucy.

"'From the foot of the mountain, to the point where there is the village called Brundlen, the road is tolerably safe. The people can even drive their cows up here; but with this precaution: two men go with the cow, one at the head, and the other at the tail, and they hold in their hands a long pole, which they keep always between the cow and the precipice, so as to make a sort of ballus-

ter, or rail, to prevent her from falling.

"'People are forced to walk very slowly on this road. Half way up, you come to a curious fir tree. From its trunk, which is eight feet in circumference, spread nine branches, each about three feet in circumference, and six feet long. From the end of each of these branches, which are about fifteen feet from the ground, there rises, perpendicularly, a fir tree. This tree looks, in shape, something like a great chandelier, with all its candles. * * * * * * * * * * * * * * * The village of Brundlen is the highest and last village on the mountain. It stands at the foot of a rock, from which enormous stones and fragments of rock frequently roll down; but the houses are so situate, *under the projecting part of the rock*, that all which falls from it, bounds over without touching them. The inhabi-

tants of this village possess about forty cows. The peasants mow only those parts of the mountain, where the cattle cannot venture to go to feed. The mowers are let down, or drawn up, to these places, by ropes, from the top of the rock; they put the grass, when they have mowed it, into nets, which are drawn up, or let down, by the same ropes, whenever it is wanted. It is remarkable, that the kinds of grass and herbs, which are found in these mountainous places, are quite different from those which grow in the low countries.'"

"My dear children, is it possible that you are interested about these grasses?" said their mother.

"No, mamma," said Lucy, "not much about the grasses; but I like that part about the mowers, let down by ropes: and I like to hear it, just as you read it to papa."

"'Round some of these stones, which have partly fallen, or mouldered away, grows a flower, which is a very dangerous poison. At four or five feet distance from this plant, the cattle perceive its smell, and they leave the grass round it untouched. The flowers of the different kinds of this plant are of a fine deep blue, yellow, or white. The white are the most uncommon; and the poison of these, it is said, is the most dangerous. Some years ago, a young man gathered some of these flowers, and held them in his hand, while he descended the mountain, to go to a dance. When he was near the place where he was to dance, he felt that his hand was numb, and he threw away the flowers. He danced afterwards, for an hour or two, with a young woman, holding her hand all the time; he grew warm; and the poison, from the poisonous flowers, it is supposed, was communicated from

his hand to hers; for they both died that night.'"

Harry and Lucy were shocked at this story.

"But, mother," said Harry, "do you think it is true?"

"That was the very thing I was considering," said his mother.

Then his father and mother began to talk about the probability of its being true or false.

They looked back for the description of the flower, and for the Latin name, which their mother, knowing that the children would not understand, had passed over. By comparing the name and description of this flower with those in botanical books, where the description and accounts of the properties of plants are given, they found that the plant of which they had been reading, was a species of *aconite*, called in English, *wolf's-bane* or *monk's-hood*; and,

as several instances were mentioned of its poisonous and fatal effects, they were inclined to believe that the story of the young man and woman's death might be true.

Lucy, seeing in some of the botanical books, in which her mother had been looking, pretty coloured drawings, or prints of flowers, asked, whether she might look at them. Her mother said, that she might at some other time, but not that evening, because Lucy could not attend both to looking at these prints, and to what she heard read aloud. So Lucy shut the books, and she and Harry put them into their places again, in the book-case, resolving, that they would look at them, together, *the next day*.

"Now, mamma," said Harry, as they drew their seats close to her, and settled themselves again, to listen; "Now for the shaking stone, mamma."

Their kind mother began immediately, and read on, as follows—

"'This stone is at the summit of the mountain (called the Ober Alp); it overhangs the rock a little, and appears as if it would fall; but this is really impossible, unless it were thrown down by a violent earthquake. The stone is as large as a moderate sized house. When any one has the boldness to get upon it to lie down, and let their head overhang the stone, they will feel the stone shake, so that it seems as if it were going to fall that moment. In 1744, the stone ceased to shake. About six years afterwards, somebody discovered that this arose from a little pebble, which had fallen through a crack, and had remained under the stone. A man fastened a great hammer to a pole, and after frequently striking the pebble with the hammer, he succeeded in dislodging it. Immedi-

ately the stone began to shake again, and has continued ever since to vibrate.'"

"How glad the man, who struck the pebble from under the stone must have been, when he saw it begin to shake again!" said Harry. "I should like to have been that man."

"Now I," said Lucy, "could not have managed the great pole and hammer: and I would rather have been the person who first discovered that the pebble had got under the stone, and that it was the cause which prevented the stone from shaking."

"O, but any body who had eyes could have seen that," said Harry.

"And yet all those people, who lived in that country, had eyes, I suppose," said Lucy; "but they were six years before they saw it."

"They had *eyes and no eyes*," said her mother, smiling.

"That is true: I understand what you mean, mamma," said Lucy. "I have read 'Eyes and No Eyes,' in 'Evenings at Home;' and I like it very much. But will you go on, mamma, if there is any thing more that is entertaining?"

"There is something more that, perhaps, would entertain you," said her mother; "but I will not read any more to you to-night, because it is time for you to go to bed."

"To-morrow night, mamma, will you read some more to us?"

"I will not promise, my dear—perhaps I may have something else to do—or perhaps you may not deserve it so well to-morrow. When to-morrow night comes, it will be time enough to give you an answer."

THE next morning, when Harry and Lucy went into their father's room, they

took care to have the bladder and the bellows ready by the time that he was up, as he had promised to show them some experiments.

"Now," said he, "we will fill this bladder with air, by blowing air into it with the bellows."

He put the end of the bellows into the neck of the bladder, and bid Harry hold the bladder, and Lucy blow the bellows.

"It is now quite full, papa," said Lucy: "I will tie the air in with a waxed string round the neck of the bladder—I know how to do that—Look how full, and round, and tight it is."

"So it is," said her father; "but now I want to let out some of the air that is in this bladder, without letting out all of it: how shall I do that?"

"I do not know," said Lucy; "for if I untie this string, I am afraid all the

air, that is in the bladder now, would come out."

"That it certainly would," said her father.

"How shall we manage it?" repeated Harry and Lucy: after considering for some time, Harry observed, that beyond the place where the bladder was tied, there was enough of the neck of the bladder left to admit the nose of the bellows: he proposed that they should put in the end of the bellows and tie the bladder round it and then untie that string with which they had at first tied the neck of the bladder. His father said, that this would do, but that he could show him what would do better. He gave him a little pipe of wood, about two inches long, that had a wooden stopper at one end, that could be easily put into the pipe, and easily taken out. He told Harry that this kind of pipe and stopper are called a *spigot* and *faucet:* he

fastened the faucet into the neck of the bladder, so that he could stop the air from coming out of the bladder when it was full, and he could at any time let out the air by taking away the peg, or spigot. Then he let out a great part of the air, that was in the bladder, till it was nearly empty, stopped the faucet again with the spigot, and then carried the bladder to the fire.

"Now you will see," said their father, "that the heat of the fire will swell the small quantity of air, remaining in the bladder, till it will fill as great a space as that which was filled by all the air, which we forced into it, at first, with the bellows—Here, Harry, take this to the fire, while I shave myself."

The children held the bladder near the fire, but it did not swell out immediately; and, after they had held it a few minutes, they began to think that it would *never do*, as Harry said. His

father told him, that he must not be so impatient, if he intended to try experiments.

"If you are tired of holding the bladder," said he, "put it down on the hearth, leave it there, and go, and do or think of something else; and, in about a quarter of an hour, perhaps, it will begin to swell out."

"A quarter of an hour! that is a great while, indeed!" said Harry.

However, the quarter of an hour passed, while the children were putting some little drawers of their father's in order. When they returned to look at the bladder, they saw that it was beginning to swell, and they watched it while it gradually swelled. First one fold of the bag opened, then another, till, at last, it was again swelled out into the shape of a globe.

"This is very extraordinary!" said Lucy, "that the little—the very little

air which papa left in the bladder, should have swelled out to this size, without any thing being added to it."

"Without *any thing* being added to it!" repeated her father: "think again, my dear."

"I have *thought again*, papa; but I assure you, nothing was added to the air: for we never opened the bladder after you put in the—what do you call it?—which fastens it."

"The spigot," said Harry.

"The spigot," said Lucy—"Well, papa, I say nothing was added to the air."

"I say, daughter, you are mistaken."

"Why, papa, we did nothing in the world, but hold the bladder to the fire, and leave it before the fire, and nobody touched it, or put any thing to it, or near it."

Still her father said—

"Think again, Lucy."

She recollected herself, and exclaimed—

"I know what you mean now, papa—heat—*heat* was added to it!"

"Yes," said her father; "heat mixed with the air in the bladder; and, by separating *the parts* of the air from each other, it made them take up more room. Now take the bladder into a cold place; hang it up here near the window, and let us see what will happen."

"I know what will happen, papa," said Lucy. "When the air in the bladder grows cold, it will *take up less room*."

"It will contract," interrupted Harry.

"And then," continued Lucy, "the bladder will shrink, and become less and less, and it will fall in folds, in a kind of loose bag, just as it was before we carried it to the fire. I shall like to see whether this will happen just as I think it will."

Lucy hung up the bladder in a cold place, and watched it for a few minutes; but she did not perceive any immediate alteration.

"It will be as long in shrinking, as it was in swelling out," said she, "and breakfast will be ready, I am afraid, before it shrinks."

"I know a way of making it shrink quickly," cried Harry.

"What is it?"

"I will not tell you; but I will show you," said Harry. "You shall see what —you shall see."

He ran out of the room, and soon returned with his little watering pot full of cold water.

"Now, Lucy," said he, "hold the basin for me under the bladder, that we may not wet the floor—hold it steady."

He poured cold water from the rose of the watering pot, so as to sprinkle the water all over the bladder, and im-

mediately the bladder began to *collapse*, or shrink; and soon, to Lucy's delight, it was diminished to the size which it had been before it was carried to the fire, and it hung like a loose, or *flaccid* bag.

"Papa, look!" said she, "look how much less room the bladder takes up now!"

"Then," said her father, "something must have been taken away from what was withinside of it."

"Yes," said Lucy.

"What was taken away?"

"Heat," replied Lucy.

"What took away the heat?"

"Cold water."

"How did that happen?"

Lucy answered, she believed that the heat went into the water—that the water must have taken away the heat of the air, that was within the bladder.

"*Attracted!*" cried Harry; "you

should say, that the water *attracted* the heat from the air."

"Well! *attracted*," said Lucy;—"first, I suppose the bladder itself became warm, by touching the warm air withinside of it; then the water took, or—*attracted*, as you tell me I must say—some of the heat from the bladder; then the bladder attracted some more heat from the inside air; and so on."

"Accurately stated, Lucy," said her father—"now you have thought enough of all these things—Stay!—before you go, tell me what you have learned from the experiments you have tried this morning."

"*Experiments*, papa!" said Lucy, smiling, and looking surprised—"I did not think, that we had been trying experiments!—I thought, that only grown up people, and philosophers, could try experiments."

"There you are mistaken, my dear,"

said her father; "an experiment is only a trial of any thing, or something done, to find out what will be the consequence. You carried the bladder to the fire, or poured cold water upon it, to find out what would happen to the air within-side of it.—Children can try some experiments, as well as grown up people can."

"Papa," cried Harry, "I have heard you talk of Dr. Franklin"——

"And of Newton," said Lucy. "I heard something"——

"Very likely, my dear," interrupted her father; "but do not fly off to Dr. Franklin and Newton, till you have answered the question I asked you just now. What have you learned from the experiments you tried this morning?"

After Lucy had recollected what she had seen and heard, she answered—"I have learned, that heat expanded,

or spread out the air, in this bladder, and that *cold*"—

"That is the want of heat," interrupted her father.

"That cold, or the want of heat, made or let the air in the bladder *grow smaller*."

"*Contract*," said Harry.

"The same effects would be produced, by taking away heat, not only from the air in that bladder, but from all air," said their father.—"Now put the bladder in the place where you found it, and let us divert ourselves with something else. Can you cut capers, Harry?"

"Yes, papa; but first I want to say something:—How very little we learn every morning! I looked at your watch, when I came into your room, and it was just half after eight o'clock, and now it is nine. So we have been here half an hour——Half an hour!—I can

scarcely believe that we have been here so long, papa?"

"Then you have not been tired, Harry?"

"No, not at all;—but I am afraid, papa, that if we learn so very little every day, we shall never get on."

"You need not be afraid of that, my dear; learning a little, a very little, accurately, every day, is better than learning a great deal inaccurately."

"A little and a little, every day regularly, makes a great deal in many days," said Lucy; "I have found this to be true, when I have been at work, and when I have done but very little each day."

"But when shall we get to the barometer?" said Harry.

"Oh! is that what you mean?" said his father—"Patience, my boy!—Patience, till to-morrow!"

"Patience, till to-morrow, I must

have, for I cannot help it," said Harry sighing—" I wish to-day was over."

" No," said Lucy, " you need not wish to-day was over. Recollect, brother, that we have a great many pleasant things to do to-day. I am sure, Harry, you cannot wish that this evening were over, because you know—though mamma did not promise it—if we deserve it—as I am sure we shall—she will read to us some more of that entertaining man's travels."

During this day, Harry and Lucy were attentive to every thing that they had to do—It snowed, so that after they had finished their lessons they could not go out, or take as much exercise as usual; but they warmed themselves by playing at hide and seek, and at battledore and shuttlecock, and at ball, at which they were allowed to play, in an empty gallery, where they could do no mischief.

The evening came, and they were

eager to know whether their mother would read to them this night. She smiled, when Lucy brought the book to her, and said—

"Yes, my dears, you have both been attentive to every thing you had to do to-day, and I shall be glad to give you this pleasure; but, first, I must write a letter."

"While you are writing, mamma," said Lucy, "may we try if we can make out any of this French? here is something, that you missed, about *la statue et la caverne*—the statue and the cavern—which looks as if it was entertaining; and I wish I could make it out—May I try, mamma?"

"Yes, my dear, provided you do not turn me into a dictionary; because I cannot write my letter and be your dictionary at the same time."

Without their mother's assistance, Harry and Lucy made out, pretty well,

the sense of what they wanted to read; and, as soon as their mother had finished her letter, Lucy began to tell her all that they had translated.

"We have found out, mamma, that it is an account of a man of the name of Huber, who wanted to go into a cavern, in a rock of black, or blackish stone (*noirâtre*), to see a statue, called *Dominique*, which was of white stone, and seemed to be about thirty feet high, —above twice as high as this room, mamma! But no one had ever been able to get to this statue, the way to it was so dangerous; they could, however, distinguish plainly, that it was the figure of a man—doing something on a table—

"'*Accoudé sur* une table—.'

"Mamma, you must, if you please, be so good to tell us what *accoudé* is; for we could not find it in the dictionary."

"It is just what Harry is doing at

this moment—leaning his elbows on the table."

"Oh, now I understand it perfectly. The figure of a man, leaning with his elbows on the table, his legs crossed, and seeming to guard the entrance of this cavern.—Well, ma'am, nobody had ever been able to get to this statue—I told you that."

"True, my dear; therefore you need not tell it to me again."

"Very well, ma'am—but this man, of the name of Huber, who was a very courageous person, was determined to get to the statue.—So, finding that he could not clamber up from the bottom of this rock, he had himself let down from the top, by a long, a very long rope, which he tied, I suppose, round his body; but it does not say so.—When he was let down—What do you think he found?—He found—how provoking!—that the rock overhung the

cavern so much, that, as he hung down this way, *like a plumb line*, as Harry says, he never could reach the entrance of the cavern, which was far in, far under the rocks; so he was forced to call to the people, to draw him up again. But he had seen enough to be almost sure that the statue was really a statue of a man, and not a white stone, that looked like a man, as some people thought it was———*So*—then, there is something about the statue's not being '*l'ouvrage fortuit de la nature*'—*that* we could not understand, so we missed it. *So* the man, Huber, got a pole, to the end of which he fastened a hook, which he thought he could hook into the rock and pull himself closer and closer to the entrance of the cavern, and so get in—So."

"But, my dear, leave out *so*—do not *sew* your story together *so*."

"*So*, ma'am——I mean—he was let

down a second time—but, oh! now, ma'am, the terrible thing!—the rope twisted and twisted continually; his weight was more than the rope could bear, and it broke, and he fell, and was dashed to pieces!"

"Poor man! Was not he very courageous, papa?" said Harry—"I admire him very much."

"He was courageous, certainly," said Harry's father; "but, before we admire him very much, we should consider what his motive was, or what good he could do by hazarding his life. If it were with the hope of being of any great service to himself, or to any one else; if it were to accomplish any useful or generous purpose, I should admire a man for risking his life: but I cannot admire him for running the chance of breaking his neck, merely to see a statue; or to find out whether it were the statue of a man or a white stone.

I remember, that, when I was at Clifton, some years ago, a boy was dashed to pieces by falling from a high rock, to which he had climbed, to look for a bird's nest. A few days after this accident happened, I saw another boy climb to the same place, in search of the same nest—This was folly, not courage."

"It was, indeed," said Harry—— "But, mamma, will you be so kind to read on?"

"Next comes," said their mother, "an account of the traveller's finding, in the wildest part of the mountain, a hut, inhabited by ten or twelve children, who lived there with a dog, who looked more savage than themselves.—They took care of a flock of goats, and lived chiefly on the milk of the goats. As soon as a stranger appeared on this part of the mountain, the children ran away, and shut themselves up in their hut, and

sent their dog after him—a dog he might be called, because he barked, but he was a peculiar and hideous-looking creature"——

"Is this all, mamma," said Lucy, as her mother stopped, "all that the man tells about the children?——I wish he had told more—I want to know how these children lived together, and whether they quarrelled, like those* in '*The Children's Friend*,' who asked their father to let them live by themselves, and govern themselves for one day ——Only for one day!—and what difficulties they got into!"

"Yes," said Harry; "but those children made themselves sick, by eating and drinking too much, and they quarrelled, because they had nothing to do, but to play all day long; but there was no danger that these poor children on the mountain should eat too much,

* Les enfans qui veulent se gouverner.

for they had scarcely anything but goat's milk, and they must have had enough to do, as there was no one to do any thing for them—But, papa," continued Harry, after thinking for a minute, "I want to know who was king among them, and I want to know what laws they made for themselves, and what punishments they had; for they could not have gone on long without some laws, I am sure."

"Pray, what would have been your laws, Harry?" said his father—"I give you a week to consider of it—you and Lucy may consult together——Now let us go on with '*The Traveller's Wonders.*'"

"I do not find any thing else worth reading to you, my dears," said their mother, "except an account of the manner in which these mountaineers are taught to walk in dangerous places; and an account of the honesty of the people,

in preserving for the hunters the game, which belongs to them."

"Ha! I shall like to hear that; we must remember *honesty* the first thing in our laws," said Harry.

"There are six hunters, who divide among themselves, and among the inhabitants of the mountain, all the game which they kill; and, in return, they are fed for nothing in the cottages.—They undergo great labour, and go into dangerous places, in pursuit of the goats and cocks of the wood. When these animals are shot, they often roll down from the highest rocks to the vallies beneath; and the peasants, who live in these vallies, when they find these dead birds and beasts, take care of them, and faithfully return them to the hunters. If this was not done, the hunters would be obliged to walk many miles to pick up the game which they kill. You see that this honesty is useful to *all* the

people who practise it—so is honesty in all cases; therefore, Harry, I think you will do right to remember it first in your laws."

"So I will," said Harry. "But, now, mamma, will you go on to the part which tells how the people learn to walk in dangerous places?"

"I am afraid it is too late to read any more to-night," answered his mother—looking at her watch.—"Good night, my dear children—We must put off the account of the walking, till another time."

"Now for the barometer!" said Harry, as he went into his father's room in the morning.

"Not yet, my dear boy," said his father; "you must know something more, before you can understand the barometer."

Harry looked disappointed for a mo-

ment; but recovering himself, he turned to observe what his father was doing. He was filling the bladder with water, to measure how much it would hold: it held five quarts, that is, ten pints.

"If you fill it ever so often, you cannot force more water into that bladder, can you?" said his father.

"No, certainly not; for, if we try to put in any more water, it will run over," said Lucy.

"Then you find," said her father, "that we cannot force the parts of water nearer to each other, as you did those of air—water differs from air, in this respect."

"Yes," said Lucy, "for when you poured water upon the bladder, the air withinside took up less room than before; therefore, the parts of the air must have come nearer together."

"But, perhaps, father," said Harry, "if this bladder was strong enough to

bear our pressing water into it, we could force more in: if you were to take an iron vessel, and try to force water into it, would it not be possible to squeeze the parts of the water closer together, by pressing down the top of the vessel?"

"No, my dear," continued his father: "if a vessel had a top, made to screw into its mouth, to fit it exactly; and if water was poured into the vessel, till it came to the very mouth of it, you could not squeeze the water down by screwing the top on. If you force the cover to screw on, the water will make its way through the screw, till the cover is screwed quite down, or it will burst the vessel."

"Burst the vessel!" cried Lucy—"an *iron* vessel, papa!—Is that possible?—I should like to see that experiment——But I believe it would be dangerous, because, when the iron vessel burst, the bits of it might be

thrown against us, and hurt us—Papa, I remember your giving mamma an account of some vessel that burst, from having too much hot water—too much steam I mean, in it."

"Yes, because heat was added to the water," said Harry——"Water, in the tea-kettle, *boils over*, when it is made very hot; and I suppose, that if the top of the tea-kettle was screwed down so tight that no steam could get out, and if the spout was stopped in such a manner that the steam could not come out there, the tea-kettle would burst."

"Yes," answered his father.

"Then there is a way of swelling water by heat?" said Lucy.

"It is not the water which swells," said her father; "while it continues water, it does not swell; but when heat mixes with it, or when it becomes what we call steam, or vapour, then it

swells, and takes up a great deal more room than it did before."

"But there was something I was in a great hurry to say," cried Lucy, "and now I have forgotten it—Talking of the *boiling over of the tea-kettle* put it out of my head."

"You mean the boiling over of the water in the tea-kettle," said her father.

"Yes, papa: but what was I thinking of?" said Lucy.

"Recollect," said her father, "what you were thinking of just before we spoke of the tea-kettle, and then, perhaps, you may recollect what you want to remember."

"We were talking of the swelling or not swelling of water by heat—O, I recollect what it was!" said Lucy—"I know a way, papa, of swelling or expanding water without heat."

"What is that way?" said Harry.

"There is a way, I assure you, bro-

ther; and you know it, or, at least, you have seen it, as well as I——Don't you know that when water is frozen it swells?"

"How do you know that, sister?"

"I know that bottles, filled with water, often burst when it freezes," said Lucy; "I assure you I have seen the water bottle in my room broken by the frost."

"That bottle had a very narrow neck," said Harry: "bottles, or jugs, that are as wide at the mouth, or wider than elsewhere, do not burst, when the water withinside of them is frozen—the jug in my room never bursts, though the water is often frozen in it."

"What is the reason of that, do you think?" said her father.

"Because there is room for the ice to expand," said Lucy.

"But does the ice expand, papa?" said Harry.

His father answered—"At the moment of freezing, the parts of ice are found to be farther from one another than the parts of the water were."

"Does cold get between the parts of the water?" said Lucy.

"No, no," said Harry—"cold is not a *thing:* papa told us that it is only a word, that expresses want of heat."

"Call it what you will," said Lucy, "but still I do not understand—What is it, papa, that gets between the parts of the ice, and makes it take up more room, and at the moment it freezes?"

"I do not know, my dear," answered her father.

"You don't know, papa!—I thought you knew every thing."

"No, my dear," said her father—"There are a great many things of which I know as little as you do—It is difficult to know any thing well. Upon this very subject, of which you were

speaking, there are different opinions; and I do not like to tell you any thing of which I am not sure."

"But, papa," continued Lucy, "one thing you can tell me, or I can tell you, that ice is the same thing as water, and water is the same thing as ice, is not it so? except that one is fluid and the other solid."

"Not quite the same—water is ice, with heat added to it, and a little air."

"Then I should have thought," said Lucy, "that water ought to take up more room than ice."

"Why, my dear?"

"Because water is ice and something more—something added to it.—We saw, when we heated the bladder, that hot air took up more room than cold air, because it was air and something added to it; for the same reason, I should have thought, that, if you add heat to ice, and so turn it into water,

again, that the water should take up more room than the ice; because, *I say*," cried Lucy, struggling to explain herself, "the water is ice, and something more—heat is added to it, you know."

"I understand you, my dear," said her father, "and what you say is very reasonable. I should have thought as you do, if I had not seen the experiment tried; but we find, from experience, that this is not the case.—However, try the experiment for yourself."

"So I will, papa," cried Lucy.—"So we will, and this very night, too, if it freezes; and I hope it will freeze; for, though I don't like the cold, I shall like very much to try this experiment; and I have a little bottle, and I will fill it with water, put it out of my window, and in the morning I dare say we shall find it burst."

"So it will," said Harry, "if the neck is narrow."

"But," said his father, "I can give you a bottle with a very wide neck; if you fill this with water up to the neck, either the bottle will break, or the ice will not only fill the bottle, but will shoot up through the neck of the bottle like a stopper.

"But what you wanted to try, I thought, was whether water takes up less room than ice," said Harry; "so to make the proof quite exact, you should take the very ice that has been frozen in the bottle, and melt it, that is, put heat to it; and then, when it is water again, try whether it takes up more or less room, or the same that it did before."

"Remember you must melt it with a gentle heat, else the heat might evaporate some of the water," said their father.

"We will take care, papa, and we will try all this," said Lucy.—"I love

trying experiments, especially when we do it together, and when you, papa, are interested about them, as we go on."

"Yes, and I love to have something to do, and something to think of," said Harry.

"And something to feel eager to go to again the next day," said Lucy; "I like to feel curious to know how the thing will turn out."

"Well, now turn out of my way, my dear," said her father, "for you are so close to my elbow that I cannot whet my razor."

It happened this day, that Lucy found, in one of her drawers, a number of horse chesnuts, which she had collected in the autumn, and which she had intended to plant; but having forgotten them, they had lain in this drawer for nearly six weeks, and they had become a little mouldy. Lucy, finding that

they were spoiled, threw them into the fire. A few minutes after she had thrown them into the fire, she was startled by hearing a noise, as loud as the noise made by a popgun, and she saw bits of coal and fire, and chesnut, thrown out on the carpet, to the distance of a yard from the hearth. While she was stooping to pick up these bits, another *pop* was heard, another chesnut burst, and more bits of coal, or fire, were thrown out, and one of them hit her arm and burnt her a little.—Nobody was with her.—She ran into the next room directly, knowing that her father was there, and she called him and told him what had happened, and asked him what she should do. He went immediately and took all the chesnuts out of the fire. Harry and his mother came while he was doing this: they were glad that Lucy had not been much hurt, and that no mis-

chief had been done. Her father then explained to her the cause of what had happened; he told her, that the heat of the fire, mixing with the water in the wet or mouldy chesnuts, had turned the water into steam, which takes up more room than water; and that the steam, being confined by the outer skin of the chesnuts, had, to make room for itself, burst through the skin, and had caused this sudden explosion.

After having explained this to Lucy, her father gave her an account of an accident which had happened to him when he was a child. He told her, that he had thought that he could make a large lead pencil, such as he had seen used for ruling children's copy books; —accordingly, he put some lead into a fireshovel, and bid his sister hold it over the fire to melt. In the mean time he fixed upright a bit of elder tree, out of which part the pith had been scooped.

The wood was not quite dry: when the lead was melted, he took the shovel from his sister, and poured it into the hole, in the piece of elder from which the pith had been scooped: but to his great surprise and terror, the melted lead was driven out of the wood with such force as actually to strike against the ceiling. None of the lead struck his face; but had he been looking over it, probably his eyes would have been burned out.

"So you see, my dear Lucy," concluded her father, "that it is particularly necessary, that children should be careful in trying experiments, as they are not acquainted with the nature or properties of the things with which they meddle. When I filled the bit of wet elder wood with hot lead, I did not know or recollect, that the heat of the lead would turn the water into steam, and the expanding suddenly of this steam would cause an explosion."

This story brought to Harry's recollection an account which his mother had read to him of another accident. Lucy had not been present when this was read, and her brother now ran for the book, and showed her the passage. She began to read—and it was as follows:—

"'At the cannon foundery in Moorfields'"——

Lucy stopped at the first line, and said that she did not know what was meant by a cannon foundery, and she did not know where Moorfields is.—Her father told her that Moorfields is the name of a part of London; and that a cannon foundery is a place where cannon are made—a foundery is a place where metals are melted, and cast into different shapes.—The word is taken from the French word *fondre*, to melt.

Lucy had seen a cannon; therefore now she quite understood this first line of what she was going to read: Harry was rather impatient at her requiring

so long an explanation; but her father said she was right, not to go on, without understanding completely what she heard.—Lucy then read—

"At the cannon foundery, in Moorfields, hot metal was poured into a mould, that accidentally contained a small quantity of water, which was instantly converted into steam, and caused an explosion, that blew the foundery to pieces.—A similar accident happened at a foundery in Newcastle, which occurred from a little water having insinuated itself into a hollow brass ball, that was thrown into the melting-pot."

Lucy was astonished to hear, that water, when turned into steam, could have such force;—from the facts, which she had just heard and read, she perceived, that it is necessary to be careful in trying experiments, and that it is useful to know the *properties* of bodies,

that we may avoid hurting either ourselves or other people.

This evening it was a frost. Harry and Lucy saw that the quicksilver, in the thermometer, was at the *freezing point*. They determined now to try the experiments, which they wished to try, about ice and water. Their father gave them a wide-necked bottle, and Harry filled it up to the bottom of the neck, leaving the neck empty; but he did not cork it. At the same time, Lucy took a common lavender-water bottle, that had wide shoulders and a very narrow neck; this she also filled up to the bottom of the neck, leaving the neck empty. Harry next filled a common phial bottle up to the mouth, stopped it closely with a cork, and tied the cork down strongly to the neck of the bottle. They hung all these bottles out of doors, on the same place on the north side of the house.

Their father went this day to dine

with a friend, at some distance from home; he was not to return till the next day at dinner time; so that the next morning, before breakfast, they missed their accustomed lesson from their father, for which they were sorry. Lucy observed, that her father's room looked dismal without him: and as there was unusual silence there, which the children did not like, they went off to the gallery, and comforted themselves, by making as much noise as possible, galloping up and down the gallery, and playing at hare and hound—It was snowing, so that they could not go out to look at their bottles; and it continued to snow for some hours, till long after the time when they had finished the day's lessons with their mother. At last the snow ceased; and, as the sun began to shine, the children were now afraid, that the water in their bottles might, if it had been frozen, be soon

thawed; therefore they put on their hats and great coats as fast as they could, and ran out to the wall on the north side of the house, and to the place where they had hung up their three bottles the *preceding* day. They found, that the lavender-water bottle, and the bottle that was tightly corked, were broken; but the bottle with the wide mouth had not been broken. The ice had swelled out through the neck of the bottle, and some way above it, looking like a stopper. This bottle they brought into their mother's dressing room, who put it upon a saucer, in a warm place, and they left it there, that the ice might melt. In the mean time, they went to help their mother to paste some prints into a large paper book. They were longer at this work than they had expected to be; they had but just finished it when the dressing bell rang: then they recollected suddenly their

experiment, and they said they must go and look whether the ice was melted; but their hands were now covered with paste, and their mother advised them first to wash their hands and dress themselves, that they might be sure to be ready, before their father should come home to dinner.

Harry and Lucy ran away, saying—"Which will be dressed first?"—And in a few minutes they came hurrying from their different rooms, eager to get to their mother's dressing room.

"I'm ready! I was here before you!" cried Harry, bursting in.

"Gently, gently, my dear Harry," said his mother, "and shut the door after you."

"Lucy's coming in, ma'am—Ha! Lucy, I was here first."

"But I had a great deal more to do, brother," said Lucy.

Her mother turned and looked at

her, as she came into the room, and observed, that Lucy's hair was not combed smoothly, and that one of her shoes was untied—

"And your hands, Lucy!" said her mother, "they are not clean—What is all this upon your hands?"

"Only the paste, ma'am, with which I was pasting those prints; but I did wash my hands, I assure you, mother."

"Yes; but you did not wash them well, I assure you, daughter—so go and wash them again, before you do any thing else; you must not neglect to keep yourself clean and neat.—This pocket-hole of your frock is torn almost from the top to the bottom."

"Yes, mamma; I tore it as I was coming down stairs; it caught upon a nail in the passage."

"Go and put on another frock, and mend this pocket-hole, before you do any thing else. Lucy," said her mother:

—"It is more necessary, that a girl should be clean and neat, than that she should try experiments."

Lucy blushed and went away to do what her mother desired.

"Mamma, I am sure it was partly my fault," said Harry, "because I hurried her too much: but to make amends, I know what I will do for her."

Then he ran for a pair of pincers, which his father had given to him; with some little difficulty he took the nail, on which Lucy's frock had been caught, out; and with some little difficulty, Lucy washed the paste off her hands, and mended her frock.

When they went to look at their experiment, they found that the ice which they had left in the bottle was quite melted, and that the water had sunk to the place where it had been before it was frozen. The top of the water just came to the bottom of the neck of the

bottle. So they were convinced, that water takes up less room than ice; or, in other words, that water, when it is frozen, takes up more room than it does when it is not frozen. When their father came home this day to dinner, Harry and Lucy told him the *result*, or end, of their experiments; and they said, that the experiments had turned out just as he had foretold that they would.—Their father said, that he was glad that they had tried the experiments, and had satisfied themselves of the truth.

After dinner the children ran eagerly for the wide-necked bottle, that they might show their father, that the water was *really* exactly at the place where it was before it had been frozen. They had left the bottle on the hearth, in their mother's dressing room: and as they knew exactly the spot where they had left it, they thought they could find it

without a candle, especially as they expected that there would be a little glimmering light from the fire in the dressing-room. However, the fire being almost out, they could scarcely see their way; they felt about near the corner of the chimney, but no bottle was there; they felt water on the hearth.

"Oh! our bottle is broken!" exclaimed Lucy—"Who has done this?"

"Are you sure it is broken?—May be it is not," said Harry; "I will open the shutters, and then we shall see by the moonlight."

He drew up the curtain, unbarred and opened the shutters; then they saw, alas! that their bottle was broken. The dog was lying before the fire, and, in taking his customary place, had thrown down the bottle.

"Oh, our dear, dear, wide-necked bottle, with which I intended to do so many things," cried Lucy.

"Fie! fie! naughty dog!—down!

down, sirrah!" cried Harry, as the dog, now awakening, attempted to leap up and caress him!—"Down, sirrah!"

"But don't call him *sirrah!* Don't be in a passion with him," said Lucy:—"He did not know—he did not mean to do us any harm: it was our fault for leaving the bottle here, just in his way. Come here, poor fellow," added she, as the dog was slinking away ashamed.—Harry, ashamed too of his anger, joined Lucy in patting him, and both he and his sister were now pleased with themselves, for bearing their disappointment with good humour.—The moon shone full on the window, and Harry, as he went to close the shutters again, called Lucy to look at "the beautiful sky, and the glorious number of bright stars in the heavens."

Lucy, as she looked and admired them, recollected something she had read, in Sandford and Merton, about the names and places of the stars; the

polar star, and *Charles's wain*, and the *great bear*, and the *little bear*.—At the time when she had read it, she had not understood it, because she had never observed the places of the stars in the sky; but this night she and Harry read over that part of Sandford and Merton again; and when they looked at the stars and compared them with the description, they understood it perfectly:—They went on to read the account of the use which little Sandford made of his knowledge of the stars, when he lost his way one night in crossing a great moor, between his father's house and his uncle's.

Harry and Lucy were glad, that they had found something entertaining to read to themselves; because their father and mother were both engaged with their own employment this night, and could not attend to them. While they were reading, Lucy wanted her pencil, to draw for Harry the figure of Charles's wain, and to make the map of the sky,

with dots for each star, which Tommy Merton had proposed to make. But Lucy had not her pencil in her pocket; she had left it in her mother's dressing room, on the chimney-piece, as well as she recollected, and when she went to look for the pencil, by the fire light, she saw the pieces of her broken bottle: she had a great mind to put them into the fire, for she knew that glass would melt if it was put into the fire. She recollected the print of the glassblower, which she had seen in her "*Book of Trades*," and she wished much to see glass melted. But recollecting also at this moment, that she had done mischief, by throwing the chesnuts into the fire, she determined not to throw this glass into the fire, without asking, first, whether it would do any harm. So she carried the broken glass carefully to the room where her father and mother were sitting, and she asked, if she might put it into the fire.—Her father,

pleased by her prudence, was so good as to leave what he was doing to show Lucy what she wished to see. He put the bits of glass into the hottest part of the fire, and in a few minutes the glass became red hot. Then he sent Harry to his workshop for a pair of pincers. Harry knew the names, and shape, and places of all his father's tools; so he easily found the pincers, and he brought them. Lucy blew the fire till it became of a *white heat;* then her father took the thick part of the bottom of the glass out of the fire. It was now melted into a lump; he held it by one end with the hot tongs, and desired Harry to take hold of the other end of the glass with the pincers, and to try to pull it out as far as he could. To Lucy's surprise, the glass was now so soft and yielding, that Harry pulled it out as easily as he could have pulled out warm sealing wax; and he drew out the glass across the little

table at which his mother was sitting. When drawn out, the glass looked like a thin shining thread—like what is called *spun sugar*—that is, sugar which has been heated and melted, and drawn out in a *similar* (or like) manner.

Harry and Lucy were entertained by seeing this, and they asked several questions about the manner in which different glass things are made—they asked, for instance, how the panes of glass which they saw in windows are made; and how looking-glasses are made: and they wondered how the *cut glass*, or that which they saw in chandeliers, is made—But their father told them that they could not possibly learn so many things at once.—That, perhaps, at some future time, he should have an opportunity of taking them to see a glasshouse, and of showing them how different kinds of glass are made."

"To-morrow, papa, will you take us?" said Lucy, "or next week?"

"No, neither to-morrow, my dear, nor next week—you must not see, or attempt to learn, a variety of things at once, else you will learn nothing well, but will only have a jumble of things in your head.—Now go to bed, my dear children."

Then Harry put the pincers into their place, and threw the bits of glass into the fire; and Lucy put by their books, their pencil and paper, and their map of the stars: they were careful to put all these things into their places, because their mother had advised them not to make it troublesome or inconvenient to show them experiments, or to let them amuse themselves in the same room with her and with their father.

"Now we have put all our things into their places, mamma," said Lucy; "and after we have gone to bed you

will not have the trouble of doing that for us—Good night——You will like that we should try experiments another time, I hope, mamma, because we have not been troublesome."

In the morning, Harry and Lucy went to their father's room; and Harry observed that they had lost a day by their father's not being at home.—"So now," added he, "we must make up for it, and *get on* to the barometer."

Lucy was at this instant mixing up the lather for her father, who was going to shave. She took a tobacco pipe and blew a bubble into the air; and when it burst she said—

"Do, Harry, let me ask one more question about a bubble.—Papa, when a bubble bursts, does the air which was within side of it stay where it was,—or what becomes of it?"

"I believe that it does not stay ex-

actly in the same place where it was," said her father: "it spreads, and mixes with the rest of the air in the room. It is supposed that when there is less air in one place than in another, the air which is collected in the place which contains the most of it, rushes into that which contains the least of it."

"But what makes some places fuller of air than others?" said Lucy.

Her father said that he did not know; but he reminded Lucy that air can be squeezed into a smaller space than it usually occupies.

"Why, it occupies the whole world, does it not?" said Harry.

"No, brother, not the whole world, you know; for stones, and trees, and animals, have places in the world; but the air is all round us, and is in every place where there is nothing else."

"That is true, or nearly true, Lucy," said her father. "Harry, do you

know any other name by which people sometimes call the air, that is all round us?"

Harry said that he did not recollect any other name for it; but Lucy said that she believed the air round us is sometimes called the *atmosphere;* and she said she had heard people speak of the *pressure of the atmosphere,* but that she did not clearly understand what they meant.

"Take this hand-fire-skreen, my dear," said her father; "move it upwards and downwards, and backwards and forwards.——What do you feel?"

"I feel that I cannot move it quickly," said Lucy.

"What prevents you?—Let Harry answer."

"I believe it is the wind," said Harry.

"There is no wind in the room," said Lucy.

"But when she moves the skreen backwards and forwards I feel a wind," said Harry.

"It is the moving the skreen which puts the air in the room in motion. You will feel the air, or atmosphere, in any part of the room, if you move against it," said his father.—"Take this little parasol, open it,—half,—do not fasten it up; now run with it against the air, holding the outside of the parasol from you."

Harry did so, and found that, as he ran, the parasol was closed by the air in the room, against which he pressed. Then his father bid him stand on a chair, and let the parasol fall when it was shut; and it fell quickly. He then opened it; and when it was open, Harry let it fall from the same height. It now fell very gently; and Harry perceived that it fell slowly because when it was open it was resisted by the air

underneath it in falling: he also observed that the parasol, as it fell, *made a wind*, as he said.

His father then cut out of a card the shape of a wheel; and he cut the card in several places, from the outside, *or circumference*, towards the centre, and he turned these bits of cards sloping so as to make a little windmill; he put a large pin through the centre of it, and stuck this pin into the uncut end of a pencil, so as to make a handle. Then he blew against it; and when he found that he could blow it round easily, he gave it to Lucy, and opening the window, desired her to hold it against the air at the open window, which, rushing in suddenly, turned the little windmill. Then he shut the window, and bid Lucy run with the windmill, as fast as she could, from one end of the room to the other, holding it in such a manner, that it might press against the air as she ran.

She did so, and the windmill turned quickly; then she and Harry perceived that the forcing and pressing against the air made the windmill turn round in the same manner as it had done when the wind blew against it.

"Harry," said his father, "take these bellows, blow the fire with them —— What comes out of the *nose* or nozzle of the bellows, as it is called?"

"Air, or wind," said Harry.

"What makes that wind?"

"My blowing the bellows," said Harry.

"What do you mean by blowing the bellows?"

"Making the bellows blow," said Harry.

"But how do you make the bellows blow?"

"By pulling up the top of the bellows and shutting it down," said Harry.

"Very true," said his father: "that

opens the bellows, and makes room for air to go into them."

"The air," said Harry, "goes in at the large hole, in the bottom of the bellows."

"It does so," said his father, "and some goes in at the pipe, or nose; but what hinders the air from going out of the large hole in the bottom, where it went in?"

Harry said, "There is a little flap or door, that shuts down when I blow the bellows."

"That little door," said his father, "or *valve*, as it is called, falls down by its own weight, when you blow the bellows, and it shuts that hole; and the air, which is then in the bellows, goes out at the pipe into the fire.—If I were to paste a piece of paper over the hole, in the bottom of the bellows, what would happen?"

"The air," said Harry, "would come

into the bellows at the nose, when I lift up the top, and would go out again at the nose, when I shut the bellows."

"Then," asked his father, "what is the use of the hole, at the bottom of the *valve?*"

"I believe," answered Harry, "it is to let the air in more quickly, and more readily."

"It is so," said his father;—"I will paste a piece of paper over the hole in the bottom of the bellows, and when it is dry, to-morrow, we will see what will happen.——Now let me finish dressing myself."

THIS day was very cold, and the fire in the breakfast room did not burn so well as usual.—Harry's father, who was a man able to do things with his own hands, went for some dry wood, which he sawed into pieces of a certain length, convenient for putting on the fire.—

Harry could saw very well, and he assisted his father; Lucy stood by, and she asked him to let her try to saw. At first Lucy could scarcely move the saw; it seemed to stick in the wood, and she said she wondered how Harry could do it so easily. Harry showed her how to move the saw, and guided her hand at first: and after a little practice, with some little patience, she got on pretty well. After she had sawed the branch in two, her father split it down the middle, with a *cleaver*, or a little hatchet.—He did not allow the children *yet* to meddle with the hatchet, lest they should cut themselves, as it requires some skill, care, and practice, to be able to manage a hatchet well.

Harry and Lucy wished that they might saw wood every day for the fire. They said that it would be pleasant work; and that it would warm them

so well, that it would be so useful! ——and they begged that their father would lend them a saw, and give them wood to saw, and a block, or a *horse*, o saw upon.

Their father answered:—"My dears, do you think that I have nothing to do, but to get you everything you want? I am afraid that if I were to take the trouble to provide you with these things, you would soon grow tired, and, perhaps, after sawing half a dozen bits of wood to-day and to-morrow, you would throw aside the saw, and forget it; as I have sometimes seen you throw aside, and forget, or break toys, which delighted you the first hour or day you possessed them."

"Break! oh, father! my dear father!" cried Lucy, "*that* was only the foolish toy, *that* lady gave me, which I could not make any use or any diversion of, in the least; after I had once looked at it, there was an end of it.—I could not

move the wooden woman's arms, or do any thing with her, so I forgot her and left her on the floor, and the footman, by accident, put his foot upon her, when he was bringing in coals.——But, indeed, papa, I never break, or forget my playthings, if I can play with them—There's my cart! I have had it a year, a whole year;—and there's my hoop—my battledores and shuttlecock—my jack straws, my cup and ball—and my ivory alphabet."

"And there's my cart, and my pump, and my bricks, and my top, and our dissected maps," cried Harry—"I am never tired of them, I know.——And there is no danger, papa, that we should grow tired of a saw if you will only be as good as to give us one; because it will always give us something to do; and, as Lucy says, we grow tired only of things that we cannot make any use of.——Pray, papa, try us."

Their father was so kind as to grant their request: he lent them a saw, and a *horse*, that held the wood which they wanted to saw; and he allowed them to work in a little room, on one side of the hall, where there was no furniture, but which had been used as a sort of lumber room. Here was kept a provision of wood for the winter, and there was plenty of branches which the children could saw: their father told them to saw these into pieces of about a foot or eighteen inches long; and he said, that when they were sawn into these pieces, he would have them split.

"Papa," cried Harry, "let us do it *all* ourselves.—I can split them, I assure you; and we will take care not to cut ourselves, if you will lend us the little hatchet.—Now, father, I will show you how well I can use the hatchet.—Lucy may saw, and I will split."

Their father, however, would not

lend them the hatchet yet. He told them that if they sawed only small branches, such as he would give them, these need not be split asunder afterwards. They sawed this morning wood enough for the evening's fire. This evening they enjoyed the first fire made with wood of their own sawing—the first fire acquired by the labour of their own hands.

"Did you ever see such a delightful blaze in your life, mamma!" said Lucy.

"Papa," said Harry, "this fire has warmed us twice—I mean the sawing the wood warmed us, while we were at work; and now it warms us again, whilst it is burning——Mamma, would you be so good to begin to read about the way of walking in dangerous places, now Lucy and I are sitting so comfortably at your feet, and the fire is blazing so finely?"

Their kind mother smiled, and she began to read as follows:—

"In the neighbourhood of Mount "Pilate there are people who give "lessons in the art of walking, as re- "gularly as lessons in dancing are "given elsewhere. It is of the greatest "importance, in certain dangerous "places, to know which foot to make "use of, or which hand to use, to pre- "serve the balance of the body; and "when you are to step on sharp "pointed rocks, you must be sure "when you are to put down your "heel, or your toe, first: for want of "instruction, or for want of attend- "ing to these instructions, you might "fall down a precipice, or be obliged "to remain in a painful attitude, with- "out daring to go forwards or back- "wards. * * * * The shoes usually "worn on these mountains are merely "soles of thin light wood, which are

"tied on the foot with leather straps; "there are iron horseshoe nails, at the "bottom of the sole, which stand out "from the sole near half an inch. The "*mountain climber* depends chiefly on "his stick, or pole. This pole must "be light and pliable, and yet strong "enough to bear the weight of a man, "if it should happen, as it sometimes "does, that the pole is stretched from "one point of a rock to another, over "the man's head, while he clings, with "both hands, to it, as he passes beneath. "The point of the pole is armed with "iron at least two inches long.

"When a man wants to go down a "steep descent, he does not set out with "his face turned towards the bottom of "the hill, because his whole body "would be out of a perpendicular "line"——

"Out of a perpendicular line!" interrupted Lucy——"Mamma, I am

not clear about *perpendicular* and *horizontal*"——

"No!" cried Harry, starting up; "then, my dear Lucy, I will make you clear about them in an instant, and for ever. Look," cried he, as he stood bolt upright, "now I am perpendicular; and now," continued he, throwing himself flat down on the carpet, "now I am horizontal."

"Thank you—Now, mamma, I shall understand it."

"The man's whole body would be "out of a perpendicular line, so that "when he advanced three or four steps, "as the hill becomes steeper, he would "fall forward; therefore, the man turns "his side towards the bottom of the "hill. In this position, he has one foot "higher than the other; if his left side "is toward the bottom of the hill, his "right foot must stand highest: this "must be observed, that you may un-

" derstand the manner in which he then
" makes use of his stick. He holds it
" sloping, with both his hands, one of
" its points resting against the ground;
" and this point must be above the place
" where his highest foot stands. The
" right hand must be at the bottom of
" the stick, and the left at the middle of
" it. In this attitude, the man leans
" on the stick, with which he rakes or
" scrapes away the ground, as he descends
" the hill. You may imagine with what
" swiftness he goes, and without the
" least danger; because, his body thus
" leaning on the stick, and approaching
" the ground, there is no danger of
" falling. If, by chance, the man's feet
" were to slip, the weight of his body
" leaning on the stick, it is necessary
" only to slide the left hand, which was
" in the middle, towards the bottom of
" the stick. Then it is impossible that
" the man should slip far; because, the

" stick becoming almost perpendicular,
" and being grasped near the bottom by
" both his hands, it catches against the
" least obstacle or hollow in the ground ;
" and this is sufficient to stop the man
" from sliding farther downwards.

" In places, where there are a great
" number of loose pebbles, as the most
" skilful walker might slide down along
" with the loose pebbles, two or three
" walkers join, and agree to go together:
" they provide themselves with a long
" pole, which they all hold with one
" hand : by these means, if one slips, the
" others hold him up. If all the party
" slip, which may chance to happen, he,
" who first quits his hold of the pole, is
" punished in whatever way the others
" think proper."

" My dear little Lucy," said her mother, putting down the book, and looking at Lucy, whose eyes were closed, and whose head was nodding—

"My dear little girl, you are just asleep."

"Asleep!——O no, mamma, I am not asleep at all," cried Lucy, rousing herself.

"My dear, there is nothing shameful in being sleepy, especially at the hour when it is time for you to go to bed. —Only do not let me read to you, when you are sleepy, because you cannot possibly attend to what is read; and you would get the habit of hearing my voice going on, without minding or understanding what I say."

"O mamma! I beg your pardon, I assure you I heard the last words you read—it was something about *punished as they thought proper;* but I believe, mamma, I was sleeping a little, too, for those words joined somehow with my dream, and I was dreaming about a saw, and sawing wood; and I thought, that as I was sawing, I slipped, and saw,

and wood, and horse and all, slipped and were sliding down a hill: and just then I heard the words, punished as they thought proper."

"I know the reason she is so *shockingly* sleepy," cried Harry: "it is because she worked so hard this morning, sawing, and she is not so strong, you know, as I am."

"There is nothing *shocking*," said his father, laughing—"there is nothing shocking in your sister's being sleepy.—Good night, Lucy, my dear; go to bed ——Good night, Harry."

"No, papa, not good night to me—pray——I am not at all sleepy.—I was thinking how I should like to live on that mountain, and slide down, with my pole in my hand, and learn to walk in dangerous places. But here there are no precipices, papa; and I cannot learn to walk, as they do on Mount Pilate."

"That is a lamentable case, indeed, Harry," said his father; but if you are so exceedingly anxious to learn to walk among precipices, I can tell you how a celebrated traveller says that you may learn to do it, even in this flat country."

"Can you, papa?—O pray do tell me."

"Shut your eyes and imagine yourself among precipices, and walk on; and M. de Saussure says, you may thus accustom yourself so to the idea of danger, that you would be much less terrified afterwards, if you were among real precipices, than another person would, who had never pursued this method."

"Is this true, papa?"

"I do not know, for I have never tried it. But I should think, that you might practise walking over a narrow plank, that was raised a foot from the

ground, and, if you learn to balance your body, and walk well upon that, if you were not afraid, you would be better able to walk steadily over any narrow bridge, where there was a precipice, or water beneath."

"So I could," said Harry: "and I will try this experiment to-morrow. There is a long ladder lying on the grass before the door, and I will walk on one side of the ladder, and Lucy on the other (for I suppose she will not be asleep to-morrow), and we shall see who slips first. Good night, mamma—good night, papa—and thank you."

LUCY was quite rested and refreshed, when she wakened the next morning; and she went into her father's room with her brother at the usual hour.

The paper, which had been pasted over the hole in the bellows, was now dry; and Harry found, that, when he

lifted up the top, the air came into the bellows at the nose; but it did not come in so readily as when the hole in the bottom was open.

Harry's father now put a peg into the nose of the bellows, and desired Harry to blow. Harry, with great difficulty, lifted up the top of the bellows slowly. He knew that this difficulty was occasioned by the shutting up the opening at the valve of the bellows and at the nose; and he asked his father, how any air could now get in.

His father told him, that bellows cannot be so well made, as to hinder the air from forcing its way into them at the place where the nose is fastened to the leather; and that, besides this, the air gets in between the leather and the wood.

"I see, papa, the paper which you pasted over the hole, in the bellows, sinks inwards," said Harry, "when

you lift the top; and swells outwards, when you shut it down."

"It does so, my dear; and, if the other parts of the bellows were air tight (as it is called), the paper would be broken inwards, when I pull up the bellows."

"I suppose, papa, if it was not such strong paper, it would break now, when you lift it up suddenly."

"It would, my dear:—I will wet the paper, which will make it softer, and more *fragile*."

"What is *fragile*, father?"

"That which can be easily broken, Harry."

"Now you see, that lifting the top quickly has burst the paper."

"Yes, father, I see that the air, endeavouring to rush in, has broken the paper: the edges of it are all blown inwards."

"You perceive, then, Harry, that the

air which is in the room, and every where else, is always forcing itself into any empty space; and that, if it cannot force its way immediately, it drives any thing before it, which it can move, into that space."

"But I want to know, papa," said Harry, "what makes the parts of air fly from each other?"

His father answered, that he did not know; "but I do know," said he, "that, if heat be added to air, the parts of the air separate from each other to a greater distance, and with greater force, than when they are colder. Now, Harry," continued he, "I will close the valve, or door, of the bellows; and if we were to put the end of the bellows into this bowl of water, and if we were to open the bellows, what would happen?"

"The water would go into the bellows," said Harry.

"Why should it go in?" said his father; "the parts of water, you know, do not fly from each other, in all directions, like those of air. If the bellows were lower than the bowl, the water might fall down into them; but you see, that the bellows are higher than the water."

"I do not think," said Harry, "that the water would move itself into the bellows; it is the air, on the outside of the water, which would rush into the bellows, if the water were not in the way; the air drives the water before it, into the empty part of the bellows."

Harry's father then took a tumbler in his hand, and filled it with water, and said—"If this tumbler, that is full of water, be emptied of the water, the air that is in the room will enter into the tumbler, whether it be held, in any part of the room, upwards, or downwards, or sideways." He emptied the

tumbler. "Now," continued he, "the air fills the space in the tumbler, which the water did fill; and, whichever way I hold the mouth of the glass, whether upwards or downwards, to this side or to that, the air would go into it, and fill it."

"So it is full of air at this very moment, is it?" said Lucy. "But how can you be sure of that, papa?—because we cannot see the air."

"No; but we can feel it," said Harry. "Wet your finger and put it into the tumbler, and move it about quickly, and you will feel the air."

"I hope you are satisfied now," added he, laughing, as Lucy gravely put her finger into the tumbler, and said seriously,

"Yes, I am satisfied now."

"That is right, Lucy," said her father; "take nothing for granted. Now observe what happens, when I

put this tumbler, with its mouth downwards into the water, in this basin. Does the water withinside the tumbler rise higher than the water on the outside of it, or does it not rise so high?"

"It does not rise quite so high," said Lucy.

"What do you think is in that space, which you see above the water, in the tumbler?"

Lucy, at first, hastily answered, that there was *nothing;* but, recollecting herself, she said, there was air; and she just said the word air at the same moment when Harry said it.

"And now suppose that I could take away that air which is in the glass, immediately over the water—What do you think would happen when that air was taken away?"

Lucy said, that she did not think that any thing would happen.

Harry said, that he thought that the

water would rise in the glass, and fill the place which the air had filled.

"Very right, Harry," said his father —"it would."

"Oh! to be sure, so it would," said Lucy; "but I did not say *that*, because I was thinking you meant quite a different sort of thing, papa—when you said, *what would* HAPPEN? I thought you meant to ask, if any accident would happen—if the glass would be broken suddenly, or something of that sort—Oh, to be sure, I know the water would rise in the glass."

"And do you know, Lucy, why it would rise in the glass, or what would make it rise?"

Lucy could not tell; all she could say was, that the water would rise, because there was room for it to rise; but her brother said he believed, that the air in the room, the air that was all over the water in this basin, in which the

tumbler is turned down, would press upon that water, and, by pressing it so, would force it up into the glass, if there was no air, or any thing else in the glass, to prevent the water from rising.

His father, without telling Harry whether he was right or wrong, said, that he would try this for him.

But just then their mother came in, and told their father that breakfast had been ready some time: and she was afraid, that, if he did not come soon, the muffins would be quite cold. Immediately their father made a great deal of haste to get ready.—Harry smiled, and said—

"Ha! ha!—see what haste papa makes, now he knows the muffins are come!—he loves muffins, I see, as well as I do!"

"I dare say he loves muffins, and so do I," said Lucy; "but I know, Harry, it is not all for the sake of the muffins

that he is making this wonderful haste —there's another reason."

"What other reason?" said Harry.

"Because," whispered Lucy, "he loves mamma, as well as muffins, and he does not like to keep her waiting for breakfast *always*; particularly when she is so good, you know, and is never angry."

"I wonder whether you will be as good when you grow up," said Harry, laughing—"No, no; I dare say you will frown, this way, at your husband, and say, 'I wonder, Mr. Slow, you are never ready for breakfast!'"

"Now, papa! this morning," said Harry, "I hope we are to see the experiment, which you were going to show us yesterday, just when mamma and the muffins came. You know, papa, that you asked us, what would happen if you could take away all the air, that is in this

tumbler, between the top of the water and the glass, and Lucy said *nothing* would happen ; but she was wrong."

" Only at first, brother ; I was only wrong at first, when I did not understand papa's question ; afterwards, you know, I was as right as you were, for I said the water would rise up higher in the glass, to be sure."

" Yes, but then you did not know the reason why it would rise, and I did ; for when papa asked me, I said that the air in the room, the air that is all over the water in this basin, in which the tumbler is turned down, would press upon that water, and force it up into the glass, if there was no air left in the glass, t· hinder it."

" Well, I know that," said Lucy, " as well as you."

" Yes, when I tell it you," cried Harry ; " but I said it at first—I was right from the beginning."

"Come, come, my dear children, no boasting, Harry—no disputing, Lucy; and then you will both be right. What signifies, which of you said it first, if you both know it at last? Now, Harry, turn your attention to this, and you, Lucy: I am going to try an experiment, that will prove to you whether the water will or will not rise in the glass, when some of the air above it is taken away."

"But I can't imagine, papa," said Harry, "how you will contrive to get all the air out of the glass."

"I cannot easily get all the air out of the glass—I cannot easily produce what is called a perfect *vacuum*, that is, a place where there is nothing, no air, or any thing else; but though I cannot produce a vacuum, in the top of this glass, by taking away *all* the air, I can easily take away some of it."

"How, papa?" said Harry and Lucy

at once.—Their father answered,—"You shall see."

Then he went for a crooked or bent tube of glass—it was nearly in the shape of a capital U—He told Harry that tubes of this sort are called syphons. He put one *leg* of this tube under the bottom of the tumbler, up through the water in the tumbler, into the place which appeared empty.

He now bid Harry suck at the other end of the syphon—Harry did so; and as fast as he sucked, the water rose in the tumbler; but when Harry took away his mouth, the water fell again.

"Why does this happen, Harry?"

"It happens, I believe, father, because, when I sucked, I took away the air, that was above the water in the tumbler; and when I left off sucking, and took my mouth away, the air went again through the syphon into the tumbler above the water."

"Just so, Harry. Now the same thing would happen if I could take away the air, or lessen it by any means, in the tumbler. If I could fill, or partly fill, the tumbler, with anything that could be taken away from beneath the tumbler, while it stands in the water that is in the basin, then we should see the water rise in the tumbler, in the same manner as if the air were sucked out of it——What shall we put into it, that we can readily take out, without disturbing the tumbler?"

"I don't know," said Harry.

"Here," said his father, "is a little *spool*, or roller, upon which silk is usually wound—Now I will put this into a little frame of tin, that will support it under the glass tumbler above the water. Upon this, I have wound some very broad tape, so as to fill up a large space in the tumbler: I pull one end of the tape, under the bottom of the

tumbler, through the water that is in the saucer, so that I can unwind the whole of the tape without disturbing the tumbler. You see that the water rises in the tumbler, as I unwind, and draw out the tape; and, now that is all drawn out, the water has filled as much of the tumbler, as had before been filled by the tape."

"That is very pretty," said Harry; "I understand it. When the tape was taken away, the room that it filled would have been supplied with air, if air could have got into the tumbler; but, as it could not get in, it forced the water in the bason to go up into the tumbler."

"Now I will show you, my dear children, another method of trying this experiment. I make a little stand of halfpence under the tumbler, upon which I can put a piece of paper, without its being wet by the water in the

basin—I set fire to the paper; and, whilst it is flaming, I put the tumbler quickly over the flame into the water—now, you see, the flame goes out, and the water rises."

"Yes, papa; I suppose the flame burns out some of the air."

"It does, Harry, consume a little of the air in the tumbler; but that is not the cause why so much water rises. You saw that the flame took up a considerable quantity of room, in the tumbler, while it was burning; but, the moment that the glass covered the flame, it went out, and then the room which the flame took up, was supplied by the water, rising from the saucer."

"Yes, papa, the water was driven in by the air that wanted to get into the tumbler."

"Just so, Harry. Now, instead of putting a piece of lighted paper upon

the little stand of halfpence, I put a piece of tow, dipt in turpentine, upon it; this, you see, makes a larger flame; and, when this is extinguished, or put out, by placing the glass quickly over it, more water rises, than in the former experiment: and, if I were to dip the tow into spirit of wine, and light it, it would answer the same purpose as tow dipped in turpentine."

Their father warned the children against the danger of having more than a very small quantity of turpentine or spirit of wine brought near to the candle or to the fire, as it might easily catch fire, and set fire to their clothes, or to the furniture in the room. "All experiments in which fire is necessary," their father said, "children should never attempt to try, when they are in a room by themselves. Some grown-up person should always be present, to prevent accidents, or to assist, if any accident should happen."

The children both promised their father that they would take care never to meddle with fire when he or their mother was not present, or to try any dangerous experiments.

Harry then turned again to look at the tumbler, and repeated that it was really very pretty, to see the water rise in the tumbler, pressed up by the air that was over the water in the basin. Harry seemed still doubtful whether Lucy understood it.

"You see, Lucy, the air presses this water first, and that presses it up into the tumbler."

"Yes, I understand it perfectly," said Lucy.

"But, Harry," said his father, "you say that the air presses the water in the basin up in the glass tumbler. What do you think would happen if there was no water in the basin?"

"I believe the water would run out of the tumbler," said Lucy.

"So it would," said her father, "unless the bottom of the tumbler was ground quite smooth, and the basin also ground quite smooth."

"And what would happen if the basin and tumbler were ground quite smooth?" said Harry.

"Then," replied his father, "if you lifted up the tumbler, the basin would come up with it, from the table, and seem to stick to it."

"I should like very much to see that experiment," said Lucy; "but we have no glass vessel, or basin, ground smooth enough, I believe."

"No; but I can show you an experiment, equally satisfactory, without them," said their father.

"I fill this ale-glass with water, and I cover it with a card, having first wetted the side of the card, which is next to the glass—I now put the palm of my hand on the card, and I turn the glass upside

down on the card, which lies on my hand. You now see that, though I have taken away my hand, the card sticks to the glass."

"That is very pretty!" cried Lucy.

"But why does not the water fall out?" said Harry.

"Because the card keeps it in," said Lucy.

"Why does it keep it in?" said Harry.

"Because the card sticks to the glass," said Lucy.

"And what makes it stick to the glass?" said Harry.

Lucy did not answer immediately; but her father asked Harry if he knew.

Harry said it did not stick to the glass; "but it is held close against the glass, by the pressure of the air, that is in the room."

"That is quite right," said his father; "by the pressure of the atmosphere.

I am glad, Harry, that you know that the air presses upwards as well as dowwards, and sideways, and in all directions."

"Father," said Lucy, "will you be so good as to try that experiment again?"

"Here you see the card remains close to the bottom of the glass," said their father.

"But, father, the glass is not full," said Lucy.

"Yes, it is full," said Harry; "though it is not quite full of water, it is full of water and air."

"I left it so on purpose," said his father. "Now I will hold it to the fire, and you will see what will happen."

In less than half a minute they saw the card drop off, and the water fall on the hearth.

"What is the cause of that?" said his father.

"The heat of the fire swells, or ex-

pands the air that is in the glass, over the water, and forces it and the card downwards," said Harry.

"There was also a little steam formed," said Lucy.

"There was," said her father. "Now let us take care, and not be late at breakfast this morning."

The childen went to tell their mother of this last experiment, which pleased them particularly.

As soon as Harry and Lucy had finished their lessons this day, they went into what they now called "*their wood room,*" and sawed the provision of wood for the evening fire; and this day Harry's father lent him a little hatchet for a few minutes, while he stood by, to see whether Harry would be able to use it without hurting himself. Harry split half a dozen billets of wood, and begged that, as he had done no mischief to him-

self, or to any body, or any thing else, he might have the hatchet the next day, to split the wood in the same manner. But his father said—

"It is not likely that I should have time to stand by to-morrow, to see you split wood, though I happened to have leisure just now; and I cannot yet trust you with the hatchet when you are alone. But, Lucy, what makes you look so blue? you look as if you were very cold; I thought you had warmed yourself with sawing."

"No, papa; because I have not been sawing. Harry had the saw—You know that two of us could not use the saw at the same time; and so I had nothing to do but to give him the wood when he wanted it, or to hold it for him when he was sawing; and that you know, papa, was very cold work—This is what makes me look so blue, I suppose."

"Well, to-morrow you shall saw and I will hold the wood," said Harry, "or we will take it by turns, that will be better; you shall begin, and saw one stick through, and I will hold the wood; then I will saw, and you shall hold the wood: that will be fair, will not it, papa?—Quite just—I must be just, to be sure."

"Yes," said his father. "In your code of laws for the children on Mount Pilate, do not forget that—Nobody can govern well that is not just."

"That's true," said Harry, looking very thoughtful—"Now which must I put first, honesty or justice?"

"I think"—said Lucy, and she paused.

"What do you think, my dear?" said her father.

"I was going to say, that I thought that honesty is only a sort of justice."

"You thought very rightly, my dear—It is so."

"And what are you thinking of, yourself, may I ask you, papa?" said Lucy; "for you looked at the saw, as if you were thinking something more about your sawing."

"I was so," answered her father—"I was just thinking of a way by which you could both saw together, with the same saw."

"How, papa?"

"Invent the way for yourself, my dear."

"*Invent*, papa!—can I *invent?*" said Lucy.

"Yes, my dear; I do not know of any thing that should hinder you. To invent, you know, means——what does it mean, Lucy?"

"It means——to invent means to—think," said Lucy; "but that is not all it means; for I think very often with-

out inventing any thing——It means to contrive."

"And what does to contrive mean?"

"It means to make a contrivance for doing any thing——O papa, you are going to ask me what a contrivance means—stay, I will begin again—to invent means to think of, and to find out a new way of doing something that you want to do."

Well, now try, if you can, to invent some way of using this saw, so that you and your brother could work with it at the same time. Harry, think of it too; and whichever thinks of any thing first, speak."

"Papa," said Harry, "I recollect, the day we went to the farmer who lives on the hill, Farmer *Snug*, as Lucy and I called him, our seeing two men sawing in a sort of pit."

"I remember it," cried Lucy; "and papa told me, it was called a saw-pit."

"And one of the men stood on a board that was across the top of the pit, and the other man stood at the bottom of the pit, and they had a kind of saw that was fixed upright, perpendicularly, this way, in a sort of frame, and one of the men pulled it up, and the other pulled it down, through the wood they were sawing. Now, if Lucy and I had such a place to saw in, or if I stood upon something very high, and we had another handle to this saw——"

"But, brother," interrupted Lucy, "what would be the use, to us, of pulling the saw up and down that way? if we had but a handle at each end of this saw, why could not we saw with it, pulling it backwards and forwards, just as we stand now, without any thing more?"

"Very true, Lucy," said her father, "now you have found out, or invented,

a kind of saw, which was invented long ago, by some one else, and which is at present in common use—it is called *a crosscut saw:* I will get you a crosscut saw. Now put on your hats; I am going to walk, to see Farmer *Snug*, as you call him, about some business of my own; and you may both come with me."

Harry and Lucy got themselves ready in a minute, and ran after their father, who never waited for them. When they came to the farmer's house, while their father was talking to the farmer about his business, they ran to the saw-pit, in hopes of seeing the men sawing; but no men were at work there. As they returned they heard the sound of men sawing in a shed near the house, and they looked into the shed, as they passed, and they found two men sawing the trunk of a tree across, with something like the sort of saw which Lucy

had described to her father. They went back to Farmer Snug's to tell this to their father; but he was busy talking, and they did not interrupt him. While he was engaged with the farmer, Harry and Lucy amused themselves with looking at every thing in the parlour and kitchen of this cottage. There was one thing in the parlour which they had never seen before—Over the chimney piece hung a glass phial bottle, in which there was a sort of wooden cross or reel, on which thread was wound. This cross was much wider than the mouth or neck of the bottle; and Harry and Lucy wondered how it could ever have been got into the bottle. As they were examining and considering this, their father and the farmer, having now finished their business, came up to them.

"Ah! you've got *that there cur'ous* thing, that reel in the bottle," said the farmer; "it has puzzled my wife, and

many a wiser person, now, master and miss, do you see, to find out how that reel, thread and all, was got, or, as I say, conjured into the bottle.—And I don't doubt, but I might ha' puzzled myself over it a long time as well as another, if I had not just happened to be told how it was done, and, after, to see a man doing it, as I did, for a shilling."

"Oh, how I wish I had been by!" cried Harry.

"And I too!" said Lucy—"Pray how was it done, sir?"

"Why, master—Why, miss, you see, just this way, *very ready*——The glass was as it were—before it come to be a bottle *like* at all—was taken, and just blown over it, from a man's mouth, with fire and a long pipe. While they *was* shoeing my horse at the forge, the glass-house being next door, I stepped in—so I did."

Harry and Lucy stood looking up in

the man's face, endeavouring to understand what he said! but as Farmer Snug had not the art of explaining clearly, it was not easy to comprehend his descriptions.

"Then I will tell you what, master," said the farmer, growing impatient at finding that he could not explain himself; "it is an *unpossibility* to make a body comprehend it rightly, except they were to see it done; and the man who did it is in our market town here, hard by—He is a travelling kind of a strange man, who does not speak English right at all, not being an Englishman born, poor man!—no fault of his! so, if you think well of it, sir, I will bid him, when I go betimes to market, call at your house to-morrow,—he is going about the country, to people's houses—he blows glass, and mends weather-glasses, and sells 'mometers and the like."

"Weather glasses!—barometers!"

said Harry—"Oh, pray, papa, do let him come!"

"Thermometers—he sells thermometers, too!" cried Lucy—"Oh, pray, papa, let him come!"

Their father smiled, and said, that he should be obliged to Farmer Snug, if he would desire this man to call; and he begged, that he would call in the morning, at half-past nine o'clock, if he could. —The family usually breakfasted at ten.

So much for the pleasures of this morning. This evening, Harry and Lucy's father and mother were reading to themselves; and the children entertained themselves with putting in some more stars into their map of the sky; and they looked at the great celestial globe, which their mother had uncovered for them, and they learned the names of the signs of the Zodiac, and the months to which they belong. Lucy showed these to Harry, and said—

"Mamma does not know them all herself; let us get them by heart, and surprise her."

Accordingly they learnt them, with some little difficulty.

After they had learned these, Harry and Lucy refreshed themselves, by playing a game at *Jack-straws*, or, as some call them, *spilikins*. Lucy had taken off almost all the straws, without shaking one, and, according to the rules of the game, would, consequently, have been victorious; but, unluckily, a sudden push backwards of her father's chair shook her elbow, shook her hand, shook *Jack-straw*, just as she was lifting him up, and he fell!

Harry, clapping his hands, exclaimed—

"There!—you shook!—you shook!—you've lost."

Lucy looked at her brother, and smiled.

"She has lost the game," said their mother; "but she has won a kiss from me for her good humour."

Lucy indeed, bore the loss of her game very good-humouredly; and, when she went to wish her father and mother good night, they both kissed her and smiled upon her.

"THE barometer-man is to come to-day, papa, at half after nine, and it is half after eight now, papa.—Will you get up," said Harry.

"The man who can show us how the reel was put into the bottle," added Lucy—"Will you not get up, papa?"

Their father rose and dressed himself; and, as he was dressed by nine o'clock, they had half an hour to spare, before the time when this *much-expected* man was appointed to come.

"Why should we waste this half hour, Harry?" said his father; "let us go on

with what we were talking of yesterday morning.—Do you recollect the experiments we tried yesterday?"

"Certainly, papa," said Harry; "you mean the experiments you showed us, with the burning tow and the turpentine, to make an empty space—a *vacuum*, I remember, you called it—in the tumbler, that we might see whether the water would rise and fill the place, which the air had filled—Yes, papa, I remember all this perfectly."

"And I remember the experiment you tried with the roll of tape, papa, which you put under the glass—When you unrolled the tape, and pulled it gently from under the tumbler, the water went up, and took the place of the tape that was unrolled."

"But, papa!" cried Harry, "I have thought of something!—I want to ask you a question, papa."

"Ask it then, my dear; but you need

not begin, by telling me that you want to ask a question."

"What I want to say, papa, is this"——

"Think, first, my boy, and when you clearly know what you mean to say, speak; and begin without that foolish preface of *what I want to say is this.*"

"What I want," Harry began from habit, but stopped himself, and began again—

"Would the water run up into a very high vessel, papa, as well as it ran into the tumbler, if you suppose, that some of the air, in the high vessel, were taken out of it?"

"Yes," answered his father: "if the vessel were as high as the room in which we are, the water would remain in it, if it were quite emptied of air."

Harry asked if it would stay in the vessel, were it as high as the house.

"No, it would not," answered his

father: "because the pressure of the *atmosphere* is not sufficient to hold up the weight of such a column of water as could be contained in a pipe forty feet high; though it is sufficient to *support* or *sustain*, or hold up, the water, that could be contained in a pipe thirty-four feet high."

Harry said he did not understand this.

"I am not surprised at that," said his father; "for you are not used to the words *pressure of the atmosphere*, or *column of water*, and to other words, which I make use of. But," continued his father, "if we had a pipe forty feet long, with cocks such as are in tea urns fitted well into each end of it, and if the pipe were placed upright against a wall, with the bottom of it in a tub of water, and if the lower cock were shut, and if the upper cock were opened, the pipe might, by means of a tundish, or funnel,

be filled with water. Now, Harry, if the lower cock were open what would happen?"

"The water would run out at the bottom," answered Harry, "and would overflow the tub."

"True," said his father.

"But now suppose the pipe were filled again with water; and if the cock at the top were shut, and the cock at the bottom opened, under water, would the water in the tube run out?"

"No, it would not," said Harry; "the pressure of the atmosphere, at the bottom of the pipe, would prevent it from falling out."

"That would be the case," said his father, "if the pipe was only thirty-three or thirty-four feet high; but this pipe is forty feet high, so that the water in six feet of the top of the tube would run out; and, if this were let to run out very gently, the water in the re-

maining thirty-three or thirty-four feet would continue supported by the *pressure of the atmosphere* on the water in the tub."

"Papa," said Lucy, "there is a tub of water in the area under the window in my room; and this would be a fine way of raising water up into my room, without the trouble of carrying it up stairs."

"My dear, that is an ingenious thought," said her father; "but you are mistaken—I will not attempt at present to tell you exactly how——"

"Here is the barometer-man, papa!" interrupted Lucy—"I saw an odd little man, with a box under his arm, go by the window—Hark!——There he is, knocking at the door."

The man was shown into a room, which was called the workshop. He was a little thin man, with a very dark complexion, large black eyes, and, as

the children observed, had something ingenious and good-natured in his countenance, though he was ugly. Though he could not speak English well, he made them understand him, by the assistance of signs. He began to open his box, and to produce some of his things; but Harry's father asked him to rest himself, after his walk, and ordered that he should have breakfast brought to him.

Harry and Lucy despatched their breakfast with great expedition; they thought that their father and mother were unusually slow in eating theirs, and that their father drank an uncommon number of dishes of tea; but at last he said—"No more, thank you, my dear"—and, putting aside the newspaper, he rose, and said—

"Now, children, now for the *barometer-man*, as you call him."

"Mamma!—mamma!—pray come

with us!" said the children: they took her by the hand, and they all went together.

"Now, mamma, you shall see what Farmer Snug described to us yesterday," said Lucy.

"No—what he could not describe to us, yesterday, you mean," said Harry—"How a reel, or a kind of wooden cross, mamma, is put into a bottle, or how the bottle is made or blown over the reel—I do not understand it *quite* yet."

"So I perceive, my dear," said his mother smiling.

"But this man will show it to us, mamma," said Lucy. "And I generally understand what I see, though I often do not understand what I hear."

Alas! to Harry and Lucy's great disappointment, this man, when they had, with great difficulty, made him understand what they wanted, told them that he could not blow a bottle,

such as they had seen at the farmer's, without being in a glass-house, or without having such a fire or furnace as there is in a glass-house.

This was a sad disappointment!—and, what Harry thought still worse, the man had sold all his barometers. However, he had some little thermometers, and Lucy's mother bought one for her and gave it to her. Lucy coloured all over her face, and her eyes sparkled with pleasure, when her mother put it into her hand, and Harry was almost as glad as she was.

"Is it really for me!—for my own, mamma!—I will take care, and not break it. Harry, we can hang it up in our wood-room, and see every day how cold, or how hot the room is, before and after we begin to work—and we can try such a number of nice experiments."

"Pray, sir," said Lucy to the man,

"how do you make these thermometers?"

The man said he would show her; and he took out of his box some long tubes of glass, and a long brass pipe, and a lamp. It was a lamp with which he could melt glass. When he had lighted his lamp, it made a large flame, which he blew with a brass pipe, that he held in his mouth. Her father told her that this pipe was called a blow-pipe. With it the man blew the flame of the lamp, and directed it to one of the glass tubes, which he held in his other hand. In a little time, the heat began to melt the glass, and it melted into a round ball; this he heated again in the flame of the lamp, and when the glass was soft and melting, he closed that end of the pipe, and it looked like a lump of melted glass; then he blew the air in with his mouth, through the other end of the glass pipe, till the air

blown withinside of the pipe reached the end, which was melting; and the air being strongly blown against it, it swelled out into a bubble of melted glass, and thus made the bulb of a thermometer-tube—he left it to cool very slowly, and when it was cool it became hard, and was a perfect thermometer tube.

Harry's father had some *syphons* and bent tubes of different shapes made for him. Harry was very glad of this; for he thought he could try many different experiments with these.

The thermometer man was now paid and dismissed.

As soon as he was gone, Harry and Lucy went to their usual occupations; for they never missed any day their regular lessons. Then came sawing wood—then walking out——Happy children! always doing something useful or agreeable.

This evening, when they were sitting round the fire after dinner, and after his father had finished reading the newspaper, when he was not busy, Harry asked him what glass is made of.

"I thought you had known that, long ago, Harry," said his father—"Surely I have told you, have not I?"

Yes, papa, I believe—I dare say you have; but I always forget; because I never was very curious, or much interested about it, till now; but now when we have been seeing, and thinking, and talking so much about glass, I think I shall remember what it is made of, if you will be so good as to tell me once more."

His father desired Harry to bring him some sand, which was lying in a paper in his study—Harry did so.—Then his father said to his mother—

"I wish I had some alkali, to show

the children—some barilla ashes—Have you any in the house?"

"No."

There were no barilla ashes; but she recollected that a heap of fern and bean stalks had been lately burned near the house, and the ashes of these were to be easily had.

Some of these ashes were brought upon a plate; and Harry's father placed the ashes and the sand before him, and said—

"These, when burned together, would make glass."

"I shall never forget it," said Harry —"Now I have seen the real things of which glass is made; I shall never forget them."

"That is what I say too," cried Lucy; —"seeing things, and seeing them just at the very time I am curious about them, makes me remember easily, and exceedingly well."

"Taste these ashes," said their father —"this *pot*-ash, as it is called; wet your finger, take up a little of it, and put it into your mouth."

Harry and Lucy did so; but they said the ashes had not an agreeable taste. Their father said, that he did not expect that they should think it agreeable, but that he had desired them to taste the ashes, that they might know the taste of what is called alkali—what is called an *alkaline taste*."

"I shall not forget *that*, either," said Lucy.

"How wonderful it is," continued she —looking first at the sand and ashes, and then at a glass, which she held in her hand—"how wonderful it is, that such a beautiful, clean, clear, transparent thing as glass could be made from such different looking things as sand and ashes!"

"And I wonder," said Harry, "how

people could ever think, or invent, that glass could be made of these things."

"Some say that glass was invented, or rather discovered, by a curious accident," said his father.

"Pray, papa, tell us the accident."

"Some sailors, or some merchants, who were going on a voyage, were driven by contrary winds out of their *course* (or way). They were driven close to land, and they were obliged to go on shore—the shore was sandy, and there grew near the place where these men landed a great deal of sea-weed. The men wanted to boil some food in an iron pot which they had brought on shore with them; they made a fire on the sands with sea-weed; and they observed that the ashes of this sea-weed, mixed with the sand and burned by the fire, had a glassy appearance. It looked like a kind of greenish glass. It is said, that from this observation they formed

the first idea of making glass by burning ashes of sea-weed (called *kelp*) and sand together."

"How lucky it was that they made this fire on the sand with sea-weed!" said Harry.

"How sensible those people were to observe what happened when they did so!" said Harry's father.

NEXT morning, when Harry and Lucy went into their father's room, Harry began with his usual speech—

"Now for the barometer, papa!—and," added he, "we must make haste, for we are to go to-morrow to my uncle's, and I must understand it quite before I see him again—we must make haste, papa."

"Let us go on quietly from where we left off yesterday," said his father.

"Yes, about the long pipe," said Harry.

"Pray, papa," said Lucy, "when you were speaking of the water staying in the pipe, why did you say that the water would be held up, or sustained, by the pressure of the atmosphere, to thirty-three *or* thirty-four feet high in the tube?—Why should you say thirty-three *or* thirty-four feet?—Would it not stay either at the one or at the other of these heights?"

"That is a very sensible question, Lucy," said her father. "The reason is, that the *pressure of the atmosphere* is not always the same. In fine weather it is generally greater than when it rains or snows; and before it rains or snows the *pressure*, or, as it is sometimes called, the *weight* of the atmosphere, is less than at some other times. So that, if we had such a pipe or tube, and if the upper part of it were transparent, so that we could see into the inside of it, we could tell by the

rising and falling of the water in the pipe, when the air, or atmosphere, was heavier or lighter, and then we might *suppose* that the weather was going to change. I say *suppose*, because we should not be sure."

"Then, papa," said Harry, "if the top of this pipe were of glass, it would be a barometer, would not it?"

"Yes, my dear, it would—Now you know what a barometer is."

"Why do not people make such barometers as this?" said Harry.

"Because they would be very inconvenient," said his father; "in the first place, it would be difficult to place them so as that the rise and fall of the water could be easily seen, because you must go up to the top of the house every time you wanted to consult the barometer. In the next place, the frost would turn the water in the tube into ice; and there would be an end of the barometer. But

the shining liquid that you saw in your uncle's barometer is not liable to freeze."

"That shining liquid," said Harry, "is called quicksilver, or mercury."

"Yes," said his father—"Here is some mercury, feel the weight of it."

"The quicksilver that is in this glass, papa," said Lucy, "seems as heavy as all the water that is in that decanter."

"Yes," said her father—"mercury is more than fourteen times heavier than water. Now, Harry, if the pipe, forty feet long, which we were speaking of before, was filled with quicksilver, do you think that the pressure of the atmosphere would hold up the quicksilver thirty-four feet high?"

"Certainly not, papa," answered Harry; "because the quicksilver is so much heavier than water."

Would it hold it up one quarter the same height?" said his father.

"No, it would not," answered Harry;

"because it is easy to perceive, that the quicksilver is more than four times heavier than the water."

"Very true, Harry. It has been found, by experiment, that the pressure of the atmosphere will sustain a column of mercury about twenty-nine inches high; sometimes it will sustain only a column of twenty-seven inches; and sometimes a column of thirty, more or less, according to the pressure of the atmosphere."

"How long is the tube of a barometer?" said Harry.

"It is generally about thirty-six inches ong; but, as the mercury never rises to the top of the tube, there is always an empty space, between the top of the mercury and the top of the glass, which allows the mercury to rise or fall as the pressure of the atmosphere is more or less. The glass tube of a barometer is about one-fourteenth part as long as the leaden pipe, which you said would make

a water barometer; but the quicksilver is fourteen times as heavy as water."

"All this is rather difficult," said Lucy.

"So it must appear to you, at first, my dear," said her father; "but when you have seen it often, and talked with your brother about it, you will understand it more clearly."

"But at least," said Lucy, "I know now, papa, what is meant by *the glass falling* and *rising*. It does not mean that *the glass* falls or rises, but that the mercury rises or falls in the glass."

"Very true, my dear Lucy; saying that the glass rises or falls, is an inaccurate mode of speaking Now, my dear boy, I think you will be able to understand your uncle's barometer, when you see it to-morrow; particularly if you will read, to-night, an excellent description and explanation of the barometer, which you will find in this little

book," said his father, putting "Scientific Dialogues" into his hands; it was open at the word *barometer*.

"O thank you, father!" said Harry.

"And, my dear Lucy," said her father, turning to Lucy, and showing her, in a book, which he held in his hand, a print, "do you know what this is?"

"A thermometer, papa!—Fahrenheit's thermometer—Oh, I remember what you told me about Fahrenheit's thermometer."

"I think you will be able, now, to understand this description of thermometers, my dear; and you may read it whenever you please," said her father.

"I please to read it this instant, papa," said Lucy.

So Lucy sat down, and read, in the "*Conversations on Chemistry*," the description of the thermometer; and Harry read the explanation of the barometer, in "*Scientific Dialogues*."

And when they had finished, they changed books, and Harry read what she had been reading; and Lucy read what Harry had been reading; and they liked the books, because they understood what they had read.

"I wonder what the rest of this book is about," said Harry, turning over the leaves; "here are many things I should like to know something about."

"And I should like," said Lucy, "to read some more of these conversations between Emma, and Caroline, and Mrs. B——. There seem to be drawings here, and experiments, too. Since papa has shown us some experiments, I wish to see more."

"But, my dear," said her father, "you are not able, yet, to understand that book. Look at the beginning of it. Read the first sentence."

"*Having now acquired some elementary notions of natural philosophy*——"

"What are *elementary notions?*" said Lucy, stopping short.

"I know," said Harry; "for I heard the writing-master, the other day, tell my father that he had given Wilmot, the gardener's son, some elementary notions of arithmetic, that is, first foundation notions, as it were.

"Then I have no elementary notions of natural philosophy—have I papa?" said Lucy.

"In the first place, do you know what *natural philosophy* is, my dear?" said her father.

Lucy hesitated; and at last she said she did not know clearly—she believed it was something about nature.

Harry said he believed it meant the knowledge of all natural things—things in nature; such as the air, and the fire, and the water, and the earth, and the trees, and all those things which we see in the world, and which are not made by the hands of human creatures.

Their father said, that this was partly what was meant.

"Then," said Lucy, "I have no *elementary notions of natural philosophy*."

"Yes, you have," said Harry—"All we have been learning about the air, and the wind, and the pressure of the atmosphere, and all that papa has been showing us, about water and quicksilver; these are elementary notions of natural philosophy, are not they, papa?" said Harry.

"Yes; but you have as yet learnt very little," said his father; "you have a great deal more to learn before you will be able to understand all that is in these 'Conversations on Chemistry,' and in 'Scientific Dialogues.'"

"Well, papa," said Harry, smiling, "that is what you used to say to me about the barometer; you used to say, a little while ago, that I must know a great deal more, before I could understand the barometer; but now I have

learned all *that*, and now I do understand the barometer; and, in time, *I* shall—*we* shall, I mean—know enough, I dare say, to read these books, and to understand them, just as well as we now understand the barometer and thermometer."

"Yes, and very soon, too, I dare say! —shall not we, papa?" cried Lucy.

"All in good time: we will *make haste slowly*, my dear children," answered their father. "Now go and get ready as quickly as you please, to go with your mother and me to your uncle's."

THE END.

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