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THE HONEYSUCKLE.

See page 23.

WILLIE'S
FIRST DRAWING LESSONS.

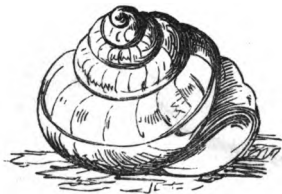
SIMPLE LINES OF NATURE.

By A LADY.

Illustrated with numerous Engravings by

PHILIP H. DELAMOTTE,

PROFESSOR OF DRAWING AT KING'S COLLEGE.



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THIS little book has been written chiefly with a view to *interest* a young child in Form by associating its instruction with familiar objects; but it has further been attempted to render the attainment of the first ideas of drawing more easy, by classifying all lines into two kinds only.

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STRAIGHT LINES.

"**ARE** you ready for your walk, my boy?" said Willie's father to him, one sweet afternoon in summer.

"Not quite, father, for I have still some of my books to put away; but I shall not be two minutes. Now I have done, and am ready for my nice walk."

"Come then, we will go by the lane to the sea-side. So you have had your first drawing-lesson with Mr. Graphic; how did you like it?"

"I enjoyed it very much, because he was so kind, and because I am glad I have begun drawing; but I haven't learned a great deal yet."

His father said, "When you had your first reading-lesson, you only learnt the letters A and B, but now you can read very nicely; so be satisfied with having learnt only so much of drawing. You will have something new to do almost every day, and you will find it always more and more amusing. I should like to know what you learnt."



"Mr. Graphic told me first all about straight lines, and then made me try to draw them."

"Well, what *is* a straight line, Willie?"

"The trunk of that fir-tree is almost a straight line."

"Why?" said his father.

"Because it hardly bends at all to the right or the left."

"Yes, but cannot you explain to me what is quite a straight line?"

"Mr. Graphic said it is the nearest way between one point and another. Stop, father,—the trunk of that tree is one point, and where I am is another; the quickest way I could get to it would be to run to it in a straight line. If I were to run out in a bend to one side or the other, or zig-zag, of course I should be longer doing it. And Mr. Graphic told me that the crows fly in a straight line to and from the places where they feed and where they roost, because they always go the shortest way."

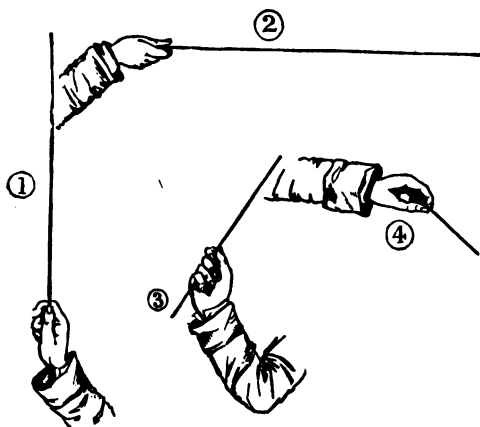
"Very well, Willie; these are good descriptions of straight lines which you only imagine; but we can also see plenty of real ones. Think of some to tell me of."

"I remember one, father. This morning I wanted to make a row in my garden of the little China-aster plants my aunt gave me yesterday, so I began to make holes for them all along one side with the gardener's dibble; but I found they were quite crooked, and I tried to do them right till I was tired; so I went to the gardener, and begged him to do them for me. He said he had not time to do them all, but he would show me the way, and then I should never have to beg any one to do it for me again. He stuck a piece of wood in at one end of the border, and another piece at the other end, and tied a string from one to the other. 'Now' he said, 'you can make your holes exactly under the string, and they will be in a neat straight line, and be done quickly, too.'"

"Yes," said his father; "and look at those men ploughing. What pains they take to make the furrows in straight lines, so as to waste no more room than they can help! And did Mr. Graphic tell you any thing about straight lines in a perpendicular, and horizontal, and oblique position?"

"Oh, yes! I was just trying to think of all those names. They are rather hard. I think I can tell you what they mean, though. Please lend me your walking-stick, father. When I hold it upright, so (1), like a fir-tree, it is perpen-

dicular; when I hold it out, so (2), it is horizontal; when I hold it slanting, like this (3), or this (4), I don't know what



it's like—it is oblique."

"Very well, my boy! If you lean against the wall with your feet a good deal out, that will be an oblique line; if you lie on the ground, you will make a horizontal line; and now that you are standing, you make a perpendicular line."

After more pleasant talk they arrived at the beach, when Willie's father said, "There is a fine horizontal line; it is called the 'line of the horizon.' You know the earth is round. Where the water joins the sky is the edge of what you can see of it. In very large plains, such as they have in some parts of the world, the effect is the same. When people are in a vessel at sea they have that line all round them. Every way they look there is a horizontal line. And see those pretty little fishing-boats: as the waves rock them from side to side, their masts are sometimes in a perpendicular, sometimes in an



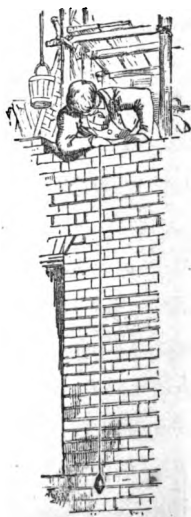
oblique position.—I have to speak to the men who are building those new houses a little farther up on the beach; will you stop here and play, or come with me?"



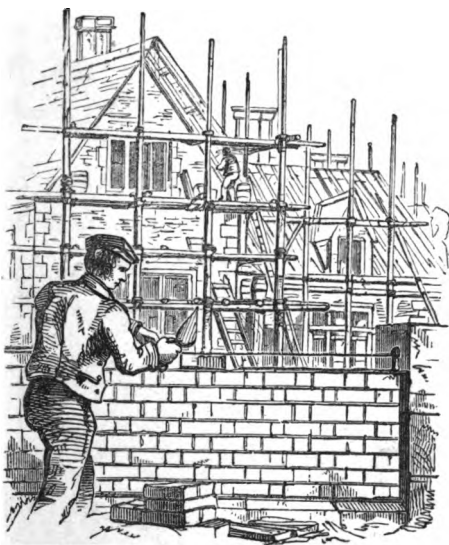
"I will come with you, please, father, for I should like to watch the men doing their work."

"Come, then."

While his father gave orders to the people, Willie went to where some bricklayers were making a wall. They had a long string, with a piece of lead tied to the end, dangling from the top of their work. He could not think at first what it was for, but he soon observed that the string hung with the weight in a perpendicular line, and that they used this as a guide by which to build their wall quite upright. "Then," thought he, "they must want a guide to



help them to put the bricks horizontally, too." He found he was right, for the men used strings fastened along the top



course of bricks to keep their work level, very much in the way the gardener did it for his planting; but still he did not know how they got this *exactly horizontal*. He saw that these houses were all made up of straight lines. The window-sills and tops of the windows were all horizontal, as also the door-steps and tops of the walls; and the sides

of all these things were perpendicular. Also the roofs and tops of the porches were all of oblique lines meeting in a point at the top.

As they were returning home Willie felt tired, for the day was very hot, and when they got to the gate of the grounds he climbed up the bars and sat on the top, while his father leaned against it to rest himself. Soon they heard something fall pop on the ground near them, and, looking, they saw an apple which had just dropped off a tree close by. Willie thought if it were ripe this would be very nice to eat, so he jumped down to get it.

"Oh, it is quite ripe," he said, "and there are several more on the tree! If I had known there were good apples here, I should have come for them before! Will you have this one, father,—and give me a little bit?"

Just then another beauty, which had been jogged and loosened by the fall of the first one, came down almost on his nose.

"Thank you, my boy, but you see there is a whole one for each of us now," said his father. "Tell me what line they took in falling to the ground."

"A perpendicular line," said Willie: "for I suppose they went by the shortest road!"

"Yes; and look, there is a pretty instance of a perpendicular line. Do you see the little spider dropping himself from that bough to the one below, by means of his thread? He will fasten it on to the branch when he gets to it. There, he is doing it now; and it makes the first line of his web. He will afterwards patiently add a great many other lines, oblique, horizontal, and perpendicular, till his clever fly-trap is finished. Do you know that those tiny threads of silk, which seem to you as fine as it is possible for lines to be, are each made of many threads stuck together?"

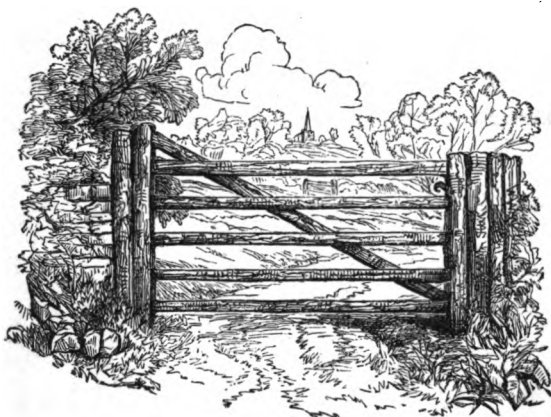


"No, I did not know that, father. It is very curious indeed!"

"Come, Willie, let us sit down on that bank to eat our apples."

"Yes, father; it will be better in the shade there."

While munching his apple, Willie observed, "Now that gate is all made up of perpendicular and horizontal lines,



and one oblique one. Do you know, I think that learning to draw will make me look at everything a great deal more. —Mr. Graphic says, too, one cannot learn drawing rightly without learning a good many other things at the same time."

"It is quite true, Willie," answered his father; "you will, for one thing, learn a little science."

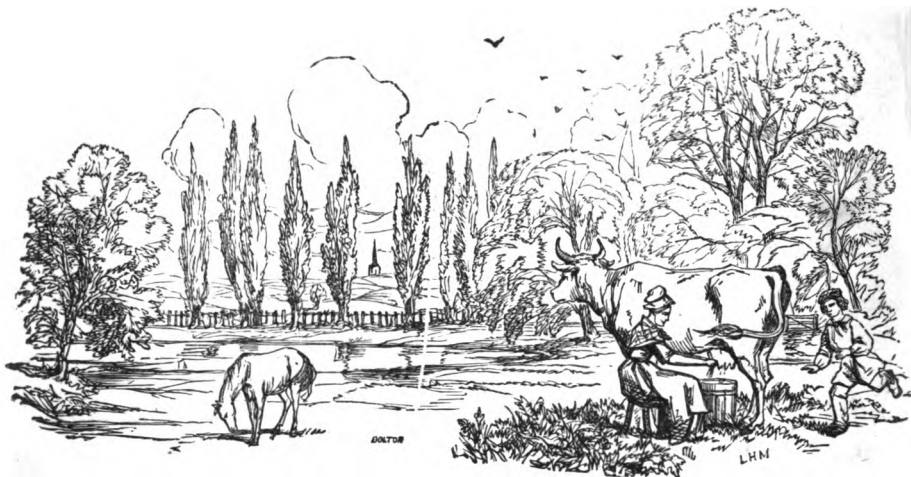
"What is *science*, father?"

"It is science to know why an apple falls to the ground

it is science to make steam turn the wheels of a carriage; it is science to measure the distance of the sun and stars from our earth; and it is science to draw a view on paper correctly. You say yourself that learning to draw will make you look at every thing much more, and this alone will teach you a great deal, if you also *think* upon what you see."

"But, father, people must be very clever to learn all those things."

"Not so! they want only steady attention and industry! But we must go now, for your dear mother is by this time expecting us home to tea."



CURVED LINES.

WILLIE and his parents loved the summer mornings, so they were always up very early. When Willie was dressed, he used to have a piece of bread to take out and eat with the warm new milk which the dairymaid gave him.

This morning, because it was his birthday, his father and mother said they would both come out with him; and they went to the paddock where the favourite cow, "Lily," was kept, to wait for the milkmaid.

The air was perfectly still, and the long cool shadows, and sparkling lights, the scent of lime-blossoms and fresh green grass, were quite fit for a birthday.

"Is it not lovely?" said Willie's mother.

"Yes! I wish I could paint; I would make a picture of the paddock this morning!" replied he.

"I hope you may be able to do so some day," said his father. "Talking of this, how do you get on with your drawing-master?"

"I have only been learning different lines and practising drawing them."

"Don't say 'only,' my boy, for when you are tolerably correct and quick in drawing these, you will have conquered one of the most troublesome things in your new study, and each succeeding step will be more pleasant than the last. What did Mr. Graphic teach you after straight lines?"

"He taught me curved lines, and he showed me about——"

"But let me hear about curved lines first, Willie. What is a curved line?"

"It is a line which does *not* go the shortest way between two points, but sweeps evenly out on one side or the other. I can show you some curved lines, father. Let me see,—Oh! Lily's horns are two curved lines, and that tall grass-flower by the post, bending down with the dew, is a curved line."



"There is the weeping-willow tree beside the pond,

nothing but curves all over, and the edge of the pond is another," added his father.

Just then the milkmaid came with her pail and stool, and sat down to milk Lily.

"Look, Patty," said Willie, running to her, "what a pretty new white mug my mother has given me to-day! Please will you fill it with milk, and froth it well up?"

"Yes, I will," said Patty. "Dear me it *is* pretty! all white,—Lily, milk, and mug!"

Patty took particular pains to froth the milk well, and the effect was splendid! Willie said, "Thank you," and then plunged his nose in and never left off drinking till the mug was empty. When he had done, and was rather out of breath, they all laughed; but Willie only stared, for he did not know the joke.

"Such a face, all over froth!" said his father.

Willie now laughed, too; and, after his mother had wiped his face, he ran about gathering wild flowers, while his father and mother stood still enjoying things in their quieter way.

Suddenly there came a little puff of wind from the south-west, which made the flowers nod and the leaves rustle gently. Then it ceased, and then came a bolder puff, and again another, till there was quite a high wind. The clouds which they had seen in the distance came riding grandly up and crowding into huge silvery masses. The big lime-trees rolled about, and roared as though they were in the most violent fits of laughter; and the wood pigeons, who had been cooing so quietly, blustered out with a great noise.

The dead twigs from the old elms flew about in all directions, and the rooks cawed and screamed, half in terror, half in delight. It was merry and healthy, that warm south-west wind.

"See!" cried Willie's father, gaily, "nearly all our perpendicular lines are turned into curves! Look at the



stems of the young larches and the poplar-trees as they stoop about!"

"Oh," exclaimed Willie, "that poor humble bee! he has been knocked off the great horse-daisy, and can't get back again for all his fuss!"

"How Sunbeam likes it," said his mother, as the chestnut colt galloped madly about, and then stopped short with eyes and nostrils wide open. "Look at his neck—there's a curve!"

The great clouds had now come overhead, and heavy raindrops began to fall, so they took shelter under a thick lime-tree. The wind lulled again, and in their snug nook they listened to the refreshing rain as it rattled among the leaves, making them a still brighter green. The thrushes called out joyously, and the wood-pigeons resettled themselves to their cooing. In about half-an-hour the sunlight broke suddenly through an opening in the clouds as they coursed rapidly away, and made the thousands of rain-drops look like little stars.

All at once Willie called out, "Oh, there's a rainbow! What a beautiful rainbow!"

"Yes, indeed," answered his mother; and the shower being nearly over, they all came out of their hiding-place to see better.

There was only a small part of the rainbow, and Willie's father asked him whether it were a straight line?

He replied, "No, it is a little curved. Ah! see, it grows longer! Now there's another bit of rainbow at the other side of the field!"

"Each grew and grew until presently the two met and made a whole glorious arch.

"That is part of a circle, you see, and a perfectly regular curve," said the father. "If the line could be continued exactly in the same manner down through the earth, it would make a great round like a hoop."

"Yes.—But do tell me what *is* a rainbow? What makes it come there?"

"It is the effect of the sun's light on the raindrops as they fall from the clouds. But you cannot understand this yet. When you are a little older I will try to show you."

"Thank you, father!" and Willie sighed. He wished he were older! He was not wise enough to feel thankful that he had so many years before him, wherein to learn good and great things, nor to know he might one day wish himself younger, that he could have the same time over again.

They now walked towards the house, and, on arriving at the garden, Willie spied out his pretty little cousin Flora, who had come to wish him many happy returns of his birthday and bring him a present from her mother, in a funny, long-shaped parcel. She looked very sily at his curiosity, for *she* knew quite well what was inside! Willie opened it eagerly, and found a nice bow with a quiver full of arrows.

"Oh, thank you, thank you! Tell my dear aunt I am very much obliged to her,—I did so want a bow!"

"Let me string it for you," said Flora, tugging with all her little strength till she had done it.

"Thank you, that's famous!" said he, and then shot off a few arrows; but so crookedly that Flora laughed at him, and he gave up, saying, "He would try by himself before she saw him shoot again." He was silent for a moment and then

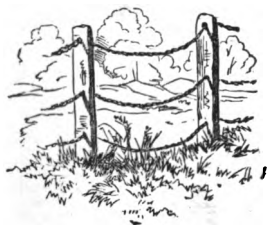


went on, pointing to his bow and expecting to astonish her this time, "Ah, Flora, if *you* learnt drawing, you would know what is called a curved line!"

"Yes, but Mr. Graphic began to teach me a week ago, and so that's not any news at all."

"O-o-o-o!" gasped Willie, blushing. And his little rogue of a cousin giggled again.

"Look," she said, "there's my skipping rope which I brought with me; when I skip it makes a great curved line; and the chain-fence makes *quantities* of curved lines. Oh! wouldn't it be nice to go and swing upon them?"



"Yes, come," cried Willie, bounding away with her.

"No, no, my dear children," said his mother; "they are all wet and would dirty your clothes; but you may go to the swing under the trees, for the shower will not have wetted that much."

"Ah, that's a curved line too," said Flora.

Here they had some fun, Willie's father swinging first one and then the other.

When they were tired of this, and were going in to breakfast, Flora found Willie's hoop lying on the ground close by, and said, "You careless boy! will you lend me this?"



"Oh, yes!"

So she ran with it towards the house.

"And that hoop is one curved line, is it not?" asked Willie's mother.

"It is; because it is the same all the way round, without any notches or joints. Mother, there's a *great number* of different curved lines, Mr. Graphic says!"

"Yes, and we will talk about some of them again by and by; but let us come in now, dear."

When breakfast was over, little Flora said she must wish them good-bye, as she had to be home early to learn her lessons; and tying on her hat, she tripped away as lightly as a little bird.

STRAIGHT AND CURVED LINES.

WILLIE then sat down to study, and having been very attentive for about two hours, his mother said, "You have been a good boy at your lessons, my darling, and as it is a glorious day, I think you might have the little treat you have been wishing for, if your father can spare time."

"What! the pic-nic in the meadow by the mill?"

"Yes."

"Oh, mother, mother!" cried happy Willie, jumping and laughing, with the tears almost in his eyes.

"And now," his mother went on to say, "go to your father in the study, while I am busy, and tell him I think it would do him good to be idle for a day with us, as he has been working so hard lately."

Willie did not stop to hear another word, but made a dash at the door, which he left wide open, and then rioted and tumbled along till he came to the study, which he entered headlong, falling flat on the floor.

"My child, my child!" said his father, who had made a

great blot in his writing, "what is all this dreadful clatter about?"

"Oh, such fun, father!" screamed Willie.

"Well, but stop a moment; it is not the way to make me enjoy it, to startle me in this manner: you needn't be rude because you are happy. Come here, now, and empty your little heart on mine."

So Willie put his arms quite gently round his kind father's neck, and told him all his mother said, and added such good begging of his own, that the poor father was quite beaten, and said, "Yes."

In an hour they were all ready, and the gig at the door.

"Shall we go by the river as far as the hand-post, near the beach, and return in the evening by the 'green lane' and the wood?" said Willie's mother.

"Yes, that will be the nicest way," replied his father; and off they started.

Chatting pleasantly they soon came to the river along which their road lay. It wound backwards and forwards among the meadows till it was lost in the distant hills.

"Tell me what lines there are in all those bends, Willie?" said his mother.

"Only two—curved lines and straight lines."

"But," asked his father, "are there no more lines in *any thing* than these?"

"No; Mr. Graphic says that trees and houses, and statues of men, and *all things*, are made only of straight lines and curved lines."

"Well, but, Willie, do you call the rough, jagged outline of that elm-tree a curve?"

"No, not one curve; it is made of a great many straight lines and curved lines joined together."

"And what would you call the zig-zag ornament on the porch of that old house?" asked his father again.



"A number of straight lines joined one to the other in points. And there is another zig-zag something like it on the roof of the house, only it has little ornaments at all the top corners. What a funny thing!—it is like lightning running along!"

"Yes," replied his father; "it is an old-fashioned way of ornamenting roofs."

"Look at the swans, like great flowers floating about," said his mother; "they seem to be relations of the beautiful water-lilies near them. How they bend their necks! I suppose Mr. Graphic would call them 'compound' curved lines, because they turn various ways; would he not?"



"I dare say he would."

"Tell me, Willie, what letter of the alphabet makes the same kind of curve as the swan's neck?"

"I must think," replied he. "Oh, it's the letter S! Mother, do let us get out of the gig and gather some of the flowers on the bank of the river."

They kindly did as he wished, and all got out, and went to the water's edge, for old Sheltie, the pony, was quiet enough to leave alone.

"Oh, father, how I do wish I could have one of those white lilies, and a big leaf with it!"

"Well, my boy, I'll try to get you one; but you and your mother must fish me out, you know, if I tumble into the water."

The good-natured father then cut a long hooked stick out of an alder-bush, and contrived to catch it to the stem of a lily so as to draw it near enough to be caught hold of. 'Tug, tug! and up it came with a great slippery stalk two yards long; then another tug at a leaf, and up that came too. They did not look quite so lovely out of the water as in, for most things are more beautiful where Nature has placed them. But Willie was very much pleased, nevertheless. He observed that each petal of the lily was formed of two fine curves meeting in a point, and that the noble dark-green leaf was also all curved. He now asked his father to cut off the long tails, that he might pack his treasures comfortably in the flower-basket, which they always took out with them.

He was still very busy arranging the flower and leaf when they heard a little rustle close by, and, looking down, saw a pretty brown snake gliding rapidly away in the grass, like a little rippling stream of water. Willie's father tried to catch it, but it disappeared immediately, no one could see where.



“Was that an adder, father?”

“No, my boy, or I should not have tried to touch it: it was a common, harmless snake. The adder is a brighter colour, and its head is a different shape. Give me your pencil, and I will show you on this card what is the difference. The common snake's head is long and narrow, and rather square at the nose; that of the adder is wider at the cheeks, where the poison-teeth are.”

“But, father, what makes those teeth more poisonous than the others?”

“There are little bags of liquid poison next to them, which are squeezed when it bites, and the poison is thus forced out through a hole in the tooth.”

“Thank you, father; I do so like to hear about animals!”

“How prettily he went along, Willie! Do you know that any line resembling that which a snake or serpent makes in gliding along the ground is called ‘serpentine’? Hence we call the line of the river ‘serpentine.’”

Willie's mother now gathered a beautiful bouquet of

honeysuckle flowers and pink and white brier-roses, to put in the basket. She called Willie to look at their forms.

He said, "The petals of this rose are made of curves and straight lines."

"Yes," answered she; "and these sweet little honeysuckle buds (*see frontispiece*), and the full flowers too, are all curves. Come now, and help me to pull up some moss to put about the flowers, or they will be quite spoilt before we return home."



In doing this, Willie found a splendid gold and slate-coloured snail-shell, which he carried with great glee to his mother.



"Oh, that is a beauty!" said she. "Look at the long curved lines in it; are you aware it is called a spiral line, dear?"

"Yes, mother."

"The line is also called a '*helix*,' helix being the Latin name for a snail," said she. "See, it follows one rule from beginning to end; that is, it keeps continually

and regularly winding round a larger and a larger space. This is a very common form in shells. Look, the way it grows is curious! The shell is, at first, very tiny indeed; but it constantly gets larger till the animal has arrived at its full size, by slimy matter, which the live creature inside gives out, being added on to the edge of the mouth of the shell, so that the new part keeps always creeping round and round the old."



"Oh, mother, I have a great many spiral shells in my box, and some have long sharp points; but I suppose they all grow the same way?"

"Yes," replied his mother. And then she said, "A ram's horn is also a spiral line;—seeing that flock of sheep coming put me in mind of it. Perhaps we may observe one among them."



"I see a fine old fellow with large horns," said Willie's father, who had just returned, unperceived by them, from wandering about further on. "How savagely he eyes us! he might be rather dangerous to offend!"

They watched the sheep for a minute or so, and were then glad to go away from them on account of the great dust they made.

"There are a great many spiral lines in nature, and of different kinds. If you look at the tendrils of the bryony, each part of their curve is, by nature, quite regular,—quite the same—but they accommodate themselves to the different forms of the objects round which they twine. How oddly they coil

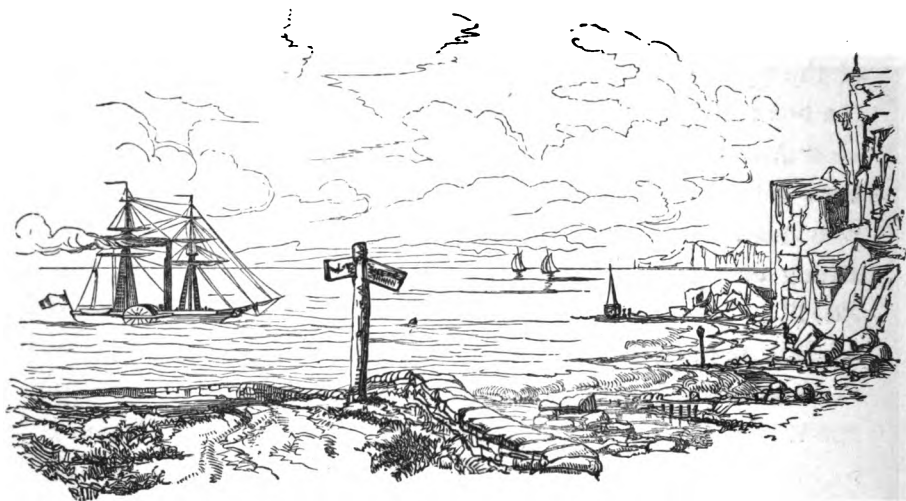
in and out about this little willow branch! They remind me of the spring of your little 'Jack-in-the-box' after you broke the box to find out what made the man jump up."

"Ah, mother," said Willie, "I was so sorry I hadn't been satisfied with your telling me what it was! And the poor man looked so miserable afterwards; the spring wasn't strong enough to hold him up, so he hung down all on one side!"

His mother laughed, and then said, "Let us make haste and gather our moss."

When they had collected some nice handfuls, Willie's mother wetted it in the river, and placed it tenderly among the flowers; after which they started again in the gig.





ANGLES.

THEY then left the river, and soon came in sight of the sea, towards which the road went. Willie begged his father to let him drive the pony, and he was allowed to do so, the road being safe, and Sheltie knowing his business very well. As they went on, his father asked him what he had learnt after curved lines.

Willie replied, "Then I learnt about angles,—right angles, and obtuse angles, and acute angles."

"Well, what is a right angle?"

"A perpendicular line joining a horizontal line makes a

right angle, father. And the corners of a square are right angles."

Just then Willie's mother cried out, "Look at that steam-vessel close to us!—we should have come in sight of it before, but for the trees. You can see the people on board. What a pretty flag! I think it is a party of pleasure, which has been out to watch the sailing-match between the two yachts, 'Carrier Pigeon' and 'Falcon,' your uncle told us of yesterday."

"It may be a 'party of pleasure,'" said his father, "but it cannot be a merrier one than ours,—do you think so, Willie?"

Willie, no doubt, thought so too; but he was very grave at that moment, for he was studying right angles.

"Father," he said, without hearing the question, "the funnel of that steamer makes a right angle with the line of the horizon and with the hull, and the smoke which blows out straight behind makes another with the funnel."

"Well done, Willie," said his mother, smiling; "that is very attentive and business-like! Now, I see still another right angle."

"Oh, mother, you mean the cliff and the sea!"

"Yes; and how beautiful the white chalk cliff is against the bright pale green water and the dark purple clouds!"

Willie was looking very intently at it, when his father called out loud, "Stop! we want to go close to the sign-post, but you needn't run us against it!"

And poor old Sheltie, who, with perfect confidence in the wisdom of his driver, was going quite unconcernedly, jig-jog,

right at it, found himself astonished by a sudden pull up from the strong hand of his elder master.

Of course there was a grand laugh at Willie's clumsiness! When this had abated a little, he said, "I suppose that sign-post was a very good right angle when it was new, but it isn't 'right' at all now. *I call it a wrong angle!*" (See page 26.)

"Still it has helped us on our way," replied his mother. "Turn to the left by that pond,—but, *please not into it!*"

On coming to the pond they saw some fine, large, club-headed rushes.

"How handsome they are!" said Willie's father. "Those great brown knobs are flowers."

"Are they really, father? I should like to have one to look at close."

"I cannot get you any," he replied, "for they grow far out in the deep mud; besides, we have already delayed a long time on the road, and it would be nice to walk about the pretty church we shall come to at the end of the village, before your mother begins

to sketch in the meadow. Do you see, they make a number of right angles with the water?"



They soon came to the old church, which stood in a yard full of trees and crosses.

"Here are right angles enough, Willie!" said his mother. "Crosses, church-tower, railings, gate, and the flat tombstone with the beautiful little cypress-tree. How many angles does a cross make?"

"Four," answered Willie; "and that one with the top broken off makes only two."



After they had walked about some time, examining the church and reading what was written on the tombstones, they went on.

"I think I can hear the water-mill," said Willie's father, "so I imagine we are close to the meadow."

As they drove through the village, the mother said, "That is the cottage where old nurse used to live."

"Oh, what a pretty little garden!" exclaimed Willie. "Roses, and Sweet-Williams, and Canterbury-bells! And what funny windows in the cottage! The little panes are all put—oh, what do you call it?—obliquely, isn't it? and they are not quite square."

"It is so in many cottages," said his mother. "I should have thought you had seen it before. I suppose they find it the easiest way of making them. As the panes are not square, the angles cannot be right angles: so what are they?"

"The angles at the top and bottom are acute, and those at the sides are obtuse."

"Yes, quite right; but tell me exactly what acute and obtuse are."

"An acute angle is sharper than a right angle,—I mean, the sides are *closer together*; and an obtuse angle is not so sharp as a right angle,—the sides are *farther apart*. When



my arm is so (1), it is a right angle; when it is so (2), it is acute; and so (3), it is obtuse."

"Very good! I see you understand what you learn, dear," said his mother.



"Oh, Mr. Graphic never lets me leave off a thing to begin a new one, till I know it perfectly. He says, unless I quite understand what I learnt, it would be like building a house with bad bricks, when the man who lived in it would waste a great deal of time and money in always repairing it. And I should be often, when I am older, stopping in my work to study things over again that I ought to have known well while I was young."

His mother laughed playfully to see the grave and wise face Willie had put on, and remarked, "I hope you will not forget this again, dear. You were not thinking of it yesterday, when you begged me to ask Mr. Graphic whether he would not begin teaching you to draw and paint figures, as 'all these lines and things were so easy, you could learn to do them afterwards!'"

Poor Willie looked pitifully at her, and said, "Oh, dear mother, don't laugh at me; I won't be silly about that any more!"

So she gave him a loving kiss, which set it all to rights, and said, "You know, no one will prevent you from amusing

yourself by drawing in any way you like during the play-hours."

And by this time they arrived at the gate of the meadow. The miller to whom it belonged kindly gave them leave to take in the pony, so Sheltie was unharnessed and turned loose to enjoy the grass. Then Willie's mother sat down under a group of fine thick sycamore-trees, and began to arrange herself to sketch the water-mill. When she was comfortable, Willie and his father set out to climb a hill rising near the meadow, upon which there was a windmill doing the same work as the water-mill, namely, grinding corn.



"You see, Willie," said his father, "the sails of that mill are only a great cross. You told us that a right angle was made by a *perpendicular* and *horizontal* line, but these are still four right angles in whichever direction they lie; are they not?"

"Oh, yes."

"Then do you know exactly what a right angle is? Do you know how to draw it correctly by measurement?"

"I haven't learnt that yet, though I think I could find out if I were to try; but Mr. Graphic says he will teach me in the next lesson. He tells me that will be a little beginning of the science of—of—I can't remember the name of it."

"Geometry?" said his father.

“Yes, that’s it.”

A cart now came by, laden with sacks of wheat for the wind-mill, and the father explained to him that the spokes of the wheels were radiating lines; that is, they all pointed to a centre, where the axle was.

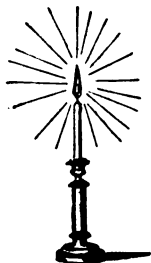
“See, Willie,” he continued, “there’s a beautiful example of radiating lines.”



“Where?”

But Willie, looking in the same direction as his father, soon saw a number of pale rays of light darting out from behind a large dark cloud which hid the sun.

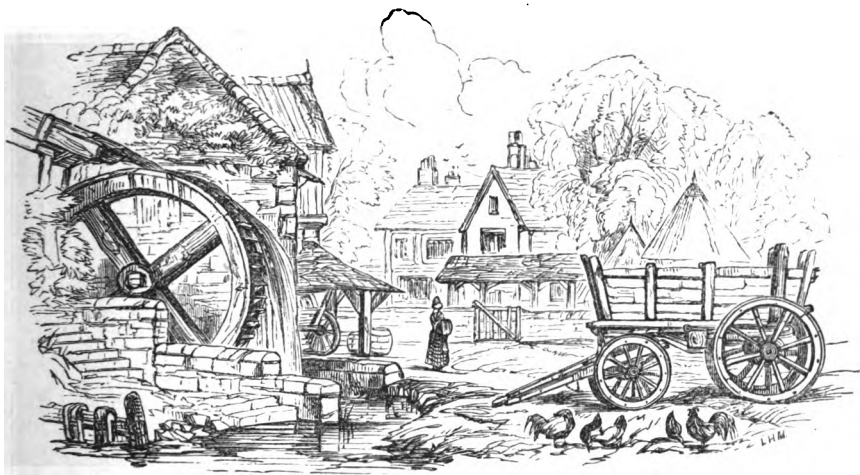
“And,” said Willie’s father, “haven’t you noticed the rays from a candle? The word ‘radiating’ comes from *ray*, as ‘serpentine’ comes from *serpent*.”



They stood watching the sky for some time, which changed every moment, when Willie suddenly discovered that he was “very hungry.”

“Well, my boy, so am I,” replied his father. “Let’s go to your mother, and ask her whether she is hungry too.”

When they arrived, they found she was so kind as to have already laid out their little dinner. There was a napkin for each to eat upon, with little salt-cellars funnily made up of stiff writing-paper, and a larger cloth was spread in the centre of the three places, upon which lay sandwiches, bread and cheese, cake, and several different sorts of eggs hard boiled, which she had collected to amuse Willie, and to make him observe the difference of their forms. There were bantams’ eggs, and ducks’, and turkeys’, and Guinea fowls’, and pigeons’, and sparrows’; and he ate one of each!



SUMMARY.

They had not been long sitting at their merry meal on the grass when Sheltie came to look on, and add to the amusement by poking his velvety nose into their laps to ask for bits of apple which the cunning old fellow knew to be a good thing. Soon after, a troop of cocks and hens belonging to the mill came prowling about around them, and uttering cautious, long-drawn chucks, as though they doubted whether they were acting prudently in trusting to strangers, yet very anxious to get what they could. But when a handful of crumbs was thrown to them they got bolder, and a grand old cock marched close to them, and then stopping and drawing himself up, said, gravely, "Uo-oo-augh!" and

waited solemnly for the result. They could not help laughing at his importance, and they threw a piece of bread at him, upon which he completely lost all his dignity, and, picking up the bread in a great hurry, ran off goodnaturedly to divide it among his companions (it would be good if all human beings were as amiable). This completely gave confidence to the whole party, and they all surrounded the dinner.

Willie's mother observed, "You may now study a variety of angles, if you observe the beaks as they open to peck, or eat, or cluck!"

They had great fun, but at last the dinner came to an end;—Sheltie and the chickens, finding no more was to be had, took themselves off, and the mother began to draw again.

Willie rambled about with his father for a long while among rich, cool meadows and shady woods, till at last the father said, "I think your mother must have finished her sketch, or if not, she cannot work much longer, for the sun is getting low."

So they turned towards the meadow where she was, and saw her just closing her book.

"Oh, do let me look!" cried Willie.

"Certainly," replied his mother.

"Oh, how pretty!" said he. "I did not think the old mill and the cottage, and that bit of farm-yard, would make such a nice picture. Did you think of me, mother, when you were drawing all those lines?"

"Yes, you rogue, I thought you would want to tell me what they were!"

Willie said, "The cottage is all made of straight lines, and these make angles."

"Well, you call that an angular form, I suppose?"

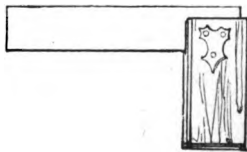
"Yes; and the cart,—that is made of angular and curved forms mixed together."

"Quite right; and what are its wheels, and the great mill-wheel?"

"They are circles, so they are called 'circular,' or 'curvilinear' forms; but the spokes of the cart-wheels are straight lines, which make acute angles."

Willie went on, "I wish I knew how people build houses so evenly; it must be a great trouble to get the roof, and windows, and doors, all right. I have seen them use a plummet to make perpendicular lines, but isn't there a quantity of measuring wanted to get the horizontal lines right?"

"No," replied his mother; "it is very easily managed by a simple contrivance, though without that it would certainly be more difficult. Carpenters and builders have what they call a 'square' (so named because it is used to make square forms). It is a right angle made of two pieces of wood, so:—I will draw it. They set one side against the perpendicular line made by the plummet, and the other side shows them exactly a horizontal line."

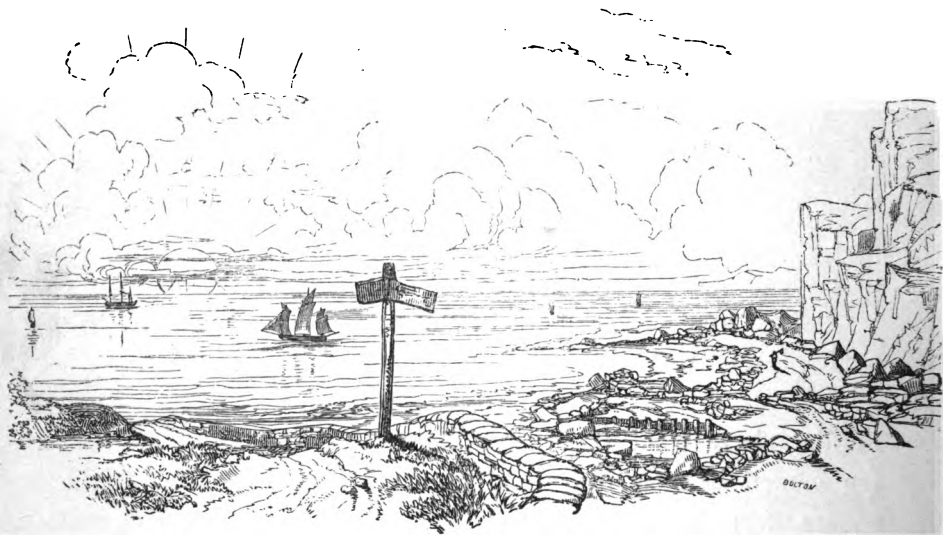


"Ah! thank you. I see it is not so difficult, after all."

"Now," said Willie's mother, speaking to his father, "I think it is almost time to go home; are you inclined?"

"Yes," replied he: "when the gig is ready it will be nearly sunset."

So, having harnessed Sheltie and repacked their things, they set off homewards. When they came again to the old sign-post the scene was very much changed. Instead of the sparkling and dazzling effect they saw in the morning, everything was calm, and soft, and rich. The sun looked a great



orange-coloured ball, and tinged everything with his noble colour.

"Which do you like best here, Willie,—the morning or the evening?" asked his mother.

"I like this very much, but I think I liked the morning

best; it was so gay with the vessel and the glitter of the sun on the waves!"

"How beautiful the reflexions are in the quiet sea!" said his father. "Willie, what would you call the form of the crescent moon there, up in the blue?"

He thought a moment, and then said, "It is made of two curves, so I think it's called a 'curvilinear' form; and the outside line makes part of a circle, because if it were to be continued, it would go round into a circle. There, now you see, I've not forgotten what you said about the line of the rainbow!—Father, do let us stop and watch the sun till it is quite out of sight."

"I think we needn't mind doing so," replied he; "for, though it will be rather dark, we shall be in no danger, as Sheltie is quiet, and the road through the wood is very smooth; besides, the moon and stars will give us a little light."

The sun kept steadily sinking lower and lower, becoming a deeper red, still tinging the white cliffs and everything with its own colour;—a long, narrow, slate-coloured cloud crossed, and partly hid it,—everything looked browner and greyer, till, at last, it was quite gone.

Then they started Sheltie into a brisk trot, and soon got to the wood, where they went rather slower. It was very dark and solemn there: the thrushes and blackbirds called out every now and then in low, sweet tones, and the tiny bats flickered about, uttering their little hissing cry.

"Mother," said Willie, "how nice and fresh the wood smells!—I should like to have a bat in my hand to look at. Oh! what was it that banged against my head?"

"A great moth, or a beetle. These creatures only come out at night.—Were we standing still, you would hear a constant little rattling and buzzing among the trees."

They stopped for a moment to listen, and heard light sounds in every direction. There seemed to be hosts of little animals running, and squealing, and climbing; yet all was so low, that, except when a bird started up and fluttered about, or a great insect came droning by, their own breath seemed the loudest noise.

As Sheltie went on again, the mother said, "How refreshing is this darkness after the glare of the heat!—But we have had a very happy day, haven't we, Willie dear?"

"Yes, indeed we have, mother!" said the little son dozily, as he leaned his head upon her warm, soft arm, and soon fell fast asleep.

