

**ABBOTT  
JACOB**

ROLLO'S  
EXPERIMENTS

Jacob Abbott

**Rollo's Experiments**

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# Jacob Abbott

## Rollo's Experiments

### JONAS AN ASTRONOMER

One day, when Rollo was about seven years old, he was sitting upon the steps of the door, and he heard a noise in the street, as of some sort of carriage approaching. A moment afterwards, a carryall came in sight. It drove up to the front gate, and stopped. Rollo's father and mother and his little brother Nathan got out. His father fastened the horse to the post, and came in.

When Rollo first heard the noise of the carryall, he was sitting still upon the steps of the door, thinking. He was thinking of something that Jonas, his father's hired boy, had told him about the sun's shining in at the barn door. There was a very large double door to Rollo's father's barn, and as this door opened towards the south, the sun used to shine in very warm, upon the barn floor, in the middle of the day.

Rollo and Jonas had been sitting there husking some corn,—for it was in the fall of the year;—and as it was rather a cool autumnal day, Rollo said it was lucky that the sun shone in, for it kept them warm.

“Yes,” said Jonas; “and what is remarkable, it always shines in farther in the winter than it does in the summer.”

“Does it?” said Rollo.

“Yes,” said Jonas.

“And what is the reason?” asked Rollo.

“I don't know,” said Jonas, “unless it is because we want it in the barn more in the winter than we do in the summer.”

“Ho!” said Rollo; “I don't believe that is the reason.”

“Why not?” said Jonas.

“O, I don't believe the sun moves about in the heavens, to different places, only just to shine into barn doors.”

“Why, it keeps a great many farmers' boys more comfortable,” said Jonas.

“Is it so in all barns?” asked Rollo.

“I suppose so,” said Jonas.

After some further conversation on the subject, the boys determined to watch the reflection of the sun's beams upon the barn floor for a good many days, and to mark the place that it came in to, at noon every day, with a piece of chalk. It was only a few minutes before the carryall came up, that they had determined upon this, and had marked the place for that day; and then Rollo had come out of the barn, and was sitting upon the door step, thinking of the subject, when his reflections were interrupted in the manner already described.

So, when Rollo saw his father getting out of the carryall, he ran to meet him, and called out to him, talking very loud and rapidly,

“Father, Jonas says that the sun shines farther in, upon the barn floor, in winter than in summer;—does it, do you think?”

But this was not a proper time for Rollo to bring up his philosophical question. His father had a carpet bag and several packages in his hands, and he was also conducting Rollo's mother in, and thinking about the horse and carryall. So he told Rollo that he must not speak to him then, for he could not attend to him.

Rollo then walked along back into the yard, and began to think of the subject of the sun's shining in at the south door. He looked up towards the sun, and began to consider what sort of a

change in its place, at noon, on different days, would be necessary in order to account for its shining in more at south doors and windows, on some days, than on others. He reflected that if the sun were exactly overhead, at noon, it could not shine in at any doors at all; for the rays would then strike perpendicularly down the sides of the houses. While he was standing thus, lost in thought, looking up to the sun, with his arm across his forehead, to shelter his eyes a little from the dazzling rays, he suddenly felt the pressure of two soft hands upon his ears, as of somebody who had come up behind him. He turned round, and found his cousin Lucy standing there.

Lucy asked him what he was thinking of, and he told her. He then took Lucy into the barn, and showed her the chalk mark upon the floor. She looked on with a good deal of interest, and said she thought it was an excellent plan; and she wished there was a great barn with a south floor at *their* house. Lucy knew more about the subject than Rollo did, and she gave him some explanations about it. "You see," said she, "that the sun rises in the east every morning, and comes up higher and higher, every hour, till noon; and then it begins to go down again, and at last it sets in the west. But, at some times in the year, it comes up higher at noon than it does at other times, and so it does not shine so much into the door."

"It shines *more*, you mean," said Rollo.

"No," said Lucy; "not so much. In the winter the sun moves around by the south, and keeps pretty low all day, and of course shines farther into doors and windows."

Then, after a moment's pause, she added,

"If we should mark the place on the floor all the year round, we should find what time the sun is farthest to the south."

"So we should," said Rollo.

"It would be in the winter," said Lucy.

"Yes," said Rollo; "in the middle of the winter exactly."

"Yes," said Lucy; "and in the middle of the summer it would be nearest overhead."

"Jonas and I will try it," said Rollo.

"I can try it in the house," said Lucy, "where the sun shines in at my chamber window."

"O no," said Rollo; "that won't do."

"Why not?" said Lucy.

"Because the window does not come down to the floor, and so does not let the sun in enough."

"O, that makes no difference," said Lucy; "we have nothing to do with the bottom of the door; you only mark where it shines in the farthest, and that place is made by the top of the door, for it shines in farthest by the top of the door."

"Well," said Rollo, "I don't know but that the house will do; but then you can't chalk on the carpet."

"Chalk on the carpet?" said Lucy.

"Yes, to mark the place."

"No," said Lucy, thinking; "but I can mark it some other way."

"How?" asked Rollo.

"Why, I can put a pin in," said Lucy.

"O dear," said Rollo, with a laugh, "put a pin in! That's no way to mark a shadow."

"It isn't a shadow," said Lucy.

"Yes, it is," said Rollo.

"No," said Lucy; "a shadow is dark, and this is bright."

"Yes," said Rollo, "this is a bright shadow; some shadows are bright, and some are dark."

"O Rollo!" said Lucy; and she turned away from him, a little out of humor.

The truth was, that Rollo and Lucy were getting decidedly into a dispute. From the sublime heights of practical astronomy, they had fallen, by a sad and very rapid descent, to a childish altercation. Rollo had a very high idea of the superior facilities afforded by Jonas's barn floor for

observing the daily changes in the sun's meridian altitude, and he did not like the idea of Lucy's finding that she had equally good opportunities for observation at her home. Lucy was a little fretted at Rollo's captious spirit; but then her mind soon became unruffled again, and she turned back towards Rollo, and said, as they walked along the yard,

"I don't think the sunshine on the floor is a shadow, Rollo; but then I don't see why a shadow would not do, just as well."

"How?" said Rollo.

"Why, look there at the shadow of that post,—that would do."

She pointed to a post with a rounded top upon it, which stood by the side of the garden gate. The shadow, clear, distinct, and well defined, was projected upon the walk; and Lucy told Rollo that they might mark the place where the top of that shadow came every day, and that that would do just as well.

"But how could we mark it?" said Rollo.

"Why, we could drive a little stake unto the ground."

"O, that would not do," said Rollo. "People would trip over them, and break them down. They would be exactly in the walk."

Lucy saw that this would be a difficulty, and, for a moment, seemed to be at a loss. At length, she said,

"We might go somewhere else, then, where the people would not come."

"But what should we do for a post?" said Rollo.

"Could not we get Jonas to drive a tall stake down?" said Lucy.

"Yes," said Rollo; "I suppose so."

The children went out into the garden to find a good smooth place, and while they were walking about there, Rollo's mother came out, and they told her the whole story. She seemed quite interested in the plan, and told them of a better way than any that they had thought of.

"You see," said she, "that the *height* of the stake or pole that makes the shadow is not material; for the shadow of a small one will vary just as much, in proportion to its length, as that of a long one will. So, instead of taking a wooden stake, out of doors, you might take a large pin, and drive it down a little way into the window sill, in the house. Then you can mark the shadow with a pen, very exactly."

"So we can," said Lucy, clapping her hands.

"And you might put a piece of white paper, or a card down first," continued Rollo's mother, "and drive the pin through that, and then mark the places where the end of the shadow comes every day, directly on the card, with a fine pen. Thus you could be a great deal more exact than you can in chalking upon a barn floor."

Rollo asked his mother if she would not be kind enough to help them fix their apparatus; but she said she would give them particular directions, though she should prefer letting them do the whole themselves, and then, if they met with any difficulties, they might come and report them to her, and she would tell them how to surmount them. So she recommended to them to go and find a blank card, or piece of white pasteboard, or of stiff white paper, as big as a common card. "Then," said she, "choose some window where the sun shines in at noon, and put the card down upon the sill, and drive the pin down through it. But you must not drive the pin through the middle of the card, for the shadow will always be off to the north of the pin, and therefore the pin may be pretty near the south end of the card. Then the shadow will be more likely to come wholly upon the card, even when it is longest. You had better place the card in such a position, too, that its sides shall lie in the direction of north and south. Then the shadow at noon will lie along exactly in the middle of it. You must get a large and stout pin, too; and drive it in firmly, a little way, with a small hammer. It will be well, too, to drive another smaller pin into the other end of the card, so as to keep it fixed in its north and south position."

"How can we know when it is north and south, exactly?" said Lucy.

“You cannot do it exactly,” said Rollo’s mother; “but you can get it pretty near. One way is to borrow father’s little compass, and adjust it by that. Another way is to see when it is exactly twelve o’clock by the clock, and then the shadow of the pin will of itself be about north.

“Then you might move the north end of the card until the shadow is brought exactly into the middle of the card, and then put the other pin in, and fix it in that place. Then if you make a mark along where the shadow comes, that mark will be a north and south line, and you can mark the place where the shadow of the pin’s head crosses that line, when it crosses it every day at noon.”

The children said that they believed they understood the directions, and they determined to try the plan. They thought they would fix two cards, one at Rollo’s house, and one at Lucy’s; and they immediately went off in pursuit of blank cards and big pins.

## PRUNING

One afternoon, Rollo saw his father coming out into the garden, with a little saw and a knife, and a small pot of paint in his hands.

“Father,” said he, “are you going to prune your trees now?”

“Yes,” said his father.

“Then, shall I go and get my wheelbarrow?”

“Yes,” replied his father, again.

So Rollo ran off after his wheelbarrow. It had been arranged, between him and his father that morning, that they should work in the garden an hour or two in the afternoon, and that Rollo should pick up all the cuttings from the trees, and wheel them away, and then, when they were dry, make a bonfire with them.

Rollo found his wheelbarrow in its proper place, and trundled it along into the garden.

“Father,” said he, “what trees are you going to prune first?”

“O, I am going to begin at the back side of the garden, and prune them all, advancing regularly to the front.”

“What is the saw for?” said Rollo.

“To saw off the large branches, that I can’t cut off easily with a knife.”

“But I should not think you would want to saw off any large branches, for so you will lose all the apples that would grow on them next year.”

“Why, sometimes, the branches are dead, and then they would do no good, but only be in the way.”

“But do they do any hurt?” said Rollo.

“Why, they look badly.”

“But, I mean, would they do any actual hurt to the tree?”

“Why, I don’t know,” said his father; “perhaps they would not. At any rate, if I cut them off pretty close to the living part of the tree, the bark will then gradually extend out over the little stump that I leave, and finally cover it over, and take it all in, as it were.”

By this time, Rollo and his father had reached the back side of the garden, and his father showed him the place where he had cut off a limb the year before, and he saw how the fresh young bark had protruded itself all around it, and was spreading in towards the centre so as to cover it over. Rollo then saw that it was better that all old dead limbs should be cut off.

“That’s curious,” said Rollo.

“Yes, very curious,” said his father. “A tree will take in, and cover up, almost any thing that is fastened to the wood, in the same manner.”

“Will it?” said Rollo.

“Yes,” said his father. “If you drive a nail into a tree, the bark will, after a time, cover it over entirely. Sometimes people find things in old trees, which were put upon them when they were young.”

“How big things?” said Rollo.

“O, I don’t know exactly how big. The tree will make an effort to enclose any thing small or large. Only, if it is very large, it will take a great while to enclose it, and it might be so large that it never could enclose it.”

“Well, father, how large must it be so that the tree never could enclose it?”

“O, I don’t know, exactly. Once I saw a tree that was growing very near a rock. After a time it came in contact with it, and it grew and pressed against it, until the rock crowded into the wood. Then the bark began to protrude in every direction along the rock, as if it was making an effort to spread out and take the rock all in. But I don’t think it will ever succeed; for the rock was part of a ledge in a pretty large hill.”

“What a silly tree!” said Rollo.

“Father, I believe I will try the experiment some time,” continued Rollo, after a pause.

“Very well,” said his father.

“What shall I put into the tree?” asked Rollo.

“You might put in a cent,” said his father, “and then, if it should get fairly enclosed, I presume the tree will keep it safe for you a good many years.”

Rollo determined to do it. “Then,” said he, “I shall never be out of money, and that will be excellent.” His father told him that he must make a small cleft in the bark and wood, with a chisel and mallet, and then drive the cent in, edgewise, a little way.

So Rollo got his chisel and mallet, and inserted the cent according to his father’s directions, and by that time there were a good many branches and twigs on the ground, which his father had taken off from the trees, and so he began to pick them up, and put them into his wheelbarrow.

They went on working together for some time, and talking while they worked. Rollo was continually asking his father questions, and his father sometimes answered them, and sometimes did not, but was silent and thoughtful, as if he was thinking of something else. But whether he got answers or not, Rollo went on talking.

“Father,” said Rollo, at length, after a short pause, during which he had been busily at work putting twigs into his wheelbarrow, “Henry has got a very interesting book.”

His father did not answer.

“I think it is a very interesting book indeed. Should not you like to read it, father?”

His father was just then reaching up very high to saw off a pretty large limb, and he paid no attention to what Rollo was saying. So Rollo went on talking half to himself—

“One story is about Aladdin and his lamp. If he rubbed his lamp, he could have whatever he wished; something would come, I have forgotten what its name was, and bring him whatever he asked for.”

Just then, down came the great branch which his father had been sawing off, falling from its place on the tree to the ground.

Rollo looked at it a moment, and then, when his father began sawing again, he said,

“Should not you like such a lamp, father?”

“Such a lamp as what, my son?” said his father.

“Why, such a one as Aladdin’s.”

“Aladdin’s! why, what do you know of Aladdin’s lamp?”

“Why, I read about it in Henry’s story book,” said Rollo. “I just told you, father.”

“Did you?” said his father. “Won’t you just hand me up the paint brush?”

“Well, father,” said Rollo, as he handed him the brush, “don’t you wish you had an Aladdin’s lamp?”

“No, not particularly,” said his father.

“O father!” exclaimed Rollo, with surprise, “I am sure *I* do. Don’t you wish *I* had such a lamp, father?”

“No,” said his father.

“Why, father, I really think I could do some good with it. For instance, I could just rub my lamp, and then have all your trees pruned for you, at once, without any further trouble.”

“But that would not be worth while; for you might have a much larger and better garden than this made at once, with thousands of trees, bearing delicious fruit; and ponds, and waterfalls, and beautiful groves.”

“O, so I could,” said Rollo.

“And, then, how soon do you think you should get tired of it, and want another?”

“O, perhaps, I should want another pretty soon; but then I could have another, you know.”

“Yes, and how long do you think you could find happiness, in calling beautiful gardens into existence, one after another?”

“O, I don't know;—a good while.”

“A day?”

“O, yes, father.”

“A week?”

“Why, perhaps, I should be tired in a week.”

“Then all your power of receiving enjoyment from gardens would be run out and exhausted in a week; whereas mine, without any Aladdin's lamp, lasts me year after year, pleasantly increasing all the time without ever reaching satiety.”

“What is satiety, father?”

“The feeling we experience when we have had so much of a good thing that we are completely tired and sick of it. If I should give a little child as much honey as he could eat, or let him play all the time, or buy him a vast collection of pictures, he would soon get tired of these things.”

“O father, I never should get tired of looking at pictures.”

“I think you would,” said his father.

Here the conversation stopped a few minutes, while Rollo went to wheel away a load of his sticks. Before he returned, he had prepared himself to renew his argument. He said,

“Father, even if I did get tired of making beautiful gardens, I could then do something else with the lamp, and that would give me new pleasure.”

“Yes, but the new pleasure would be run out and exhausted just as soon as the pleasure of having a garden would have been; so that you would, in a short time, be satiated with every thing, and become completely wretched and miserable.”

“But, father,” said Rollo, after being silent a little while, “I don't think I should get tired of my beautiful gardens very soon: I don't think I should get tired even of looking at pictures of them.”

“Should you like to try the experiment?”

“Yes, sir,” said Rollo, very eagerly.

Rollo's father had a great many books of pictures and engravings of various kinds in his library; and sometimes he used to allow the children to see them, but only a very few at a time. They had not yet seen them all. He only allowed them to see them as fast as they had time to examine them thoroughly, and read about them and understand them. But now he said to Rollo,

“I could let you have all the books of prints and engravings I have got, and see them all at one time, and that would be giving you Aladdin's lamp, exactly, so far as my pictures are concerned.”

“Well,” said Rollo, clapping his hands.

“But then, in a short time, you would get tired of looking at them; you would become satiated, and would in fact spoil the whole pleasure by attempting to enjoy it too fast. But then I think it would perhaps do you good.”

“How, father?”

“Why, by teaching you the value of moderation, and the uselessness of Aladdin's lamps in all human enjoyments. It would be a very valuable experiment in intellectual philosophy, which I think it very probable might be of use to you. So, if you please, you may try it.”

“Well, father, I am sure I should like to see the pictures.”

“That is all settled then,” said his father; “some day you shall.”

## THE GREAT BEETLE AND WEDGE

Rollo was coming home one morning after having been away on an errand, and he saw a large wood pile near Farmer Cropwell's door. Now it happened that Rollo had once been on a journey pretty far back into the country; it was at the time when Jonas told him and Lucy the stories related in the book called "Jonas's Stories." On that journey, Jonas had one day told him that the sap of the maple-tree was sweet, and had let him taste of some, where it oozed out at the end of the log. Seeing Farmer Cropwell's wood pile reminded Rollo of this; and he thought he would look at the ends of all the logs, and see if he could not find some drops of sweet sap there.

But he could not, for two reasons: none of those trees were maple-trees, and then, besides, they were all dry. There was no sap in them of any kind; at least, not enough to ooze out. While Rollo was looking there, one of Farmer Cropwell's large boys came out with an axe in his hand. He rolled out a pretty large log of wood, though it was not very long, and struck his axe into the end of it, as if he was going to split it.

"I don't believe you can split that great log," said Rollo.

"I don't expect to do it with the axe," said the boy, as he left the axe sticking in the log.

"How then?" said Rollo.

"I have got beetle and wedges here, round behind the wood pile."

So the boy went to another side of the wood pile, and brought a large beetle and an iron wedge. When he got back to his log, he started out the axe which he had left sticking into it. Then Rollo saw that the axe had made a little indentation, or cleft, in the wood. He put the point of the wedge into this cleft, and drove it in a very little, with a few light blows with the axe. Then he took the great heavy beetle, and began driving the wedge in, with very heavy blows.

Presently, Rollo saw a little crack beginning to extend out each side from the wedge. The crack ran along across the end of the log, and thence down the side, and grew wider and wider every moment. At last, the wedge was driven in as far as it would go, and still the log was not split open.

"Now stop," said Rollo; "I will put a stick in, and keep the crack open, while you drive the wedge in, in another place."

"O, that won't do," said the boy; "a stick would not keep it open."

"Why not?" said Rollo.

"Because it is not solid enough; the sides of the cleft draw together very hard. They would crush the stick."

Here Rollo put his hand into his pocket, and drew out a walnut, and he asked the boy if it would crack a walnut.

"Try it," said the boy.

So Rollo put the walnut into the crack. He slipped it along until he got it to a place where the crack was just wide enough to receive it, and hold it steady. He left it there, and then the boy began to knock out the wedge.

He struck it first upon one side, and then upon the other, and thus gradually worked it out. The walnut was crushed all to pieces. The boy then drove in the wedge again, so as to open the log as it was before. He then went to the place where he had got the beetle and wedge at first, and brought a large wooden wedge which he had made before, and began to put that into the crack, not very far from the iron wedge.

"This will keep it open," said he.

"Yes, I think it will," said Rollo. "But put it up close to the iron wedge."

"No," said the boy; "for then I can't knock the iron wedge out."

So the boy put the large wooden wedge in, at a little distance from the iron one, and drove it in rather gently with the beetle. This opened the cleft a little more, so that the iron wedge came out pretty easily.

“I don’t see what makes the sides of the logs draw together so hard,” said Rollo.

“O, they can’t help it,” said the boy.

“That is no reason,” rejoined Rollo. “I should think that, after the log is once split open, it would stay so. If I split a piece of wood in two with my knife, the pieces don’t try to come together again.”

So Rollo began to examine the log, and to look into the cracks, to see if he could find out what it was that made the parts draw together so hard as to crush the walnut. Presently, he observed that the log was not split open from end to end. The crack commenced at one end, and extended nearly towards the other, but not quite; so that at this other end the log was solid and whole, just as it always had been. So Rollo perceived that the two halves being joined and held together firmly here, they could only be separated at the other end by the wedge springing them open, and, of course, by their elasticity they tended to spring together again. Then besides, he saw, by looking into the crack, a great number of splinters, large and small, which extended obliquely from one side to the other, and bound the two sides strongly towards each other.

By this time the boy had got the wedge knocked out.

“It is strange,” said Rollo, “that such a small wedge will split such a tough and solid log.”

“O, not very strange,” said the boy. “You see,” he continued, taking up the wedge, and pointing to the several parts as he explained them, “you see here at this part, where it enters the wood it is sharp, and the sides spread out each way, so that, when I drive it in, they force the wood apart.”

“Why don’t they have the back of the wedge wider still? and then it would force the wood open farther; and then you would not have to put in a wooden wedge afterwards,—so,” he added, making a sign with his fingers. He put the tips of his fingers together, and then separated his hands, so as to represent a very blunt-shaped wedge.

“Then it would not drive in so easily,” answered the boy. “Perhaps I could not drive it in at all, if it was so blunt.”

“They might have the wedge longer then,” said Rollo, “and then it would be just as tapering, and yet it would be a great deal broader at the back, because the back would be farther off.”

“That would make the wedge a great deal too heavy. It would not drive.”

“Why, yes, it would,” said Rollo.

“No, it would not,” said the boy. “It would be just like a shoemaker’s lap-stone; pounding it would hardly move it.”

Rollo did not understand what the boy meant by what he said about the shoemaker’s lap-stone; so he paused a moment, and presently he said,

“I don’t think it would make any difference, if it was heavy. And, besides, it might be made of wood, and that wouldn’t be heavy.”

“O, wood wouldn’t do,” said the boy.

Now it happened that while they had been talking, the boy had gone on driving in his wooden wedge into the cleft that the iron one had made, and it had been gradually splitting the log open more and more. So that just as the boy was saying that “a wooden wedge wouldn’t do,” Rollo was actually seeing with his own eyes that it *would* do; for at that moment the boy gave the last blow, and the halves of the log came apart and fell over, one to one side, and the other to the other.

“Why, there,” said Rollo, “you have split the log open with a wooden wedge.”

“O, that is because I had an iron one in first,” said the boy.

“What difference does that make?” said Rollo.

“A great deal of difference,” said the boy.

“But *what* difference?” persisted Rollo.

“I don’t know exactly what difference,” said the boy; “only I know you can’t do any thing with a wooden wedge until you have first opened a seam with an iron one.”

Rollo was confident that it could not possibly make any difference whether a wooden wedge was used first or last. The boy was sure that it did, though he could not tell why. Finally, they determined to try it; so the boy struck his axe into the end of the next log, and then attempted to drive in his wooden wedge. But he did not succeed at all. The wedge would not stay. Rollo told him that he did not strike hard enough. Then he struck harder, but it did no good. The wedge dropped out the moment he let go of it, and on taking it up, they found that the edge of it was bruised and battered; so that even Rollo gave up all hopes of making it enter.

“Ah!” said the boy, taking up the wedge, and looking at it, “now I know what the reason is. It is the edge.”

“Where?” said Rollo. “Let me see.”

“Why, when there is no crack,” said the boy, “you see the edge of the wedge comes against the solid wood, and when I drive, it only bruises and batters it; but the iron is hard, and goes in. But then, when a crack is made, the wedge can go in easily; for the edge does not touch; then only the sides rub against the wood.”

“How?” said Rollo. “I don’t understand.”

“I’ll show you in a minute,” said the boy. So he took the iron wedge, and went to work driving it into the log. It soon began to make a crack, which ran along the log, and opened wider and wider. When, at length, it was pretty wide, he put the wooden wedge in, and he showed Rollo that the edge of the wedge did not now have to force its way, but went easily into the crack, and only the sides came in contact with the two parts of the log which it was separating.

“That’s curious,” said Rollo.

“Yes,” said the boy.

“I wish I had a little beetle and wedge,” said Rollo. “I have got a hammer. That would do for a beetle, if I only had a wedge.”

“O, a hammer won’t do,” said the boy.

“Why not? Would not an axe do as well as a beetle?”

“No,” said the boy, “it would spoil the axe and the wedge too.”

“How?” asked Rollo.

“Why, it would bruise it all up,—hard iron knocking against the hard iron.”

“Would it?” said Rollo.

“Yes,” replied the farmer’s boy; “it would spoil the head of the axe, and the head of the wedge too.”

“Is that the reason why they make a wooden beetle?”

“Yes,” said the boy; “and they put iron rings around the ends to keep the wood from being bruised and battered.”

“O, I wish I had a little beetle and wedge!” said Rollo.

“Perhaps you might make one.”

“O, I could not make an iron wedge—nor the beetle rings.”

“No, but you might make wedges of wood,—pretty hard wood; that would do to split up pieces of pine boards, and then you would not need any rings to your beetle.”

“Jonas can help me,” said Rollo.

“Yes,” said the boy; “Jonas will know all about it.”

So Rollo set out to go home, full of the idea of making a wooden beetle and wedge, so as to split up pieces of boards. He determined, in case he should succeed, to make a smaller one still for Thanny.

## THE LITTLE BEETLE AND WEDGE

When Rollo got home, he looked about for Jonas every where, but could not find him. He went around the house and yard, calling "Jonas! Jonas!" very loud. Presently Nathan came out to the door, and told him that his mother wanted to see him. So Rollo went in to his mother.

"You ought not to make such a noise," said she, "calling Jonas. You disturb us all."

"But, mother," said he, "I want to find him very much."

"No doubt," said his mother; "but you must find him with your eyes, not with your tongue."

"Why, mother," said Rollo, laughing, "what do you mean by that?"

"Boys very generally have a habit of trying to find people with their tongues, that is, by calling them; but it is a very bad habit. You see," she continued, "there are five or six persons now in and about the house, and if you go around calling out for Jonas, you disturb us all; but if you go about quietly, and *look* for him, you do not disturb any body."

"But then it is not so easy to find him by looking for him," said Rollo.

"Why not?" asked his mother.

"Because," said Rollo, "I can call out for him, in a moment, in the yard, and then if he is any where within hearing, he answers; and so I know where he is. But it would take me some time to go to all the places that are within hearing."

"True," said his mother, "I see it is more trouble to find any body with your eyes, than with your voice; but then it is so much pleasanter for all the rest of us, that you must submit to it."

So Rollo went away again to look for Jonas. He inquired of Dorothy in the kitchen, and she told him that she saw Jonas going out towards the barn a few minutes before. So Rollo went off in pursuit of him.

He found him at work in a little back room in the barn, looking over some harnesses.

"What are you doing, Jonas?" said Rollo.

"I am overhauling these harnesses, to get them all ready for winter."

"For winter?" said Rollo.

"Yes," replied Jonas; "they are sleigh-harnesses."

"Well, Jonas," said Rollo, "I wanted to see you about a beetle and wedge. Do you think you could help me about making a little beetle and wedge?"

"I can help you by my *advice*," said Jonas.

"O, but I want you to help me *make* them."

Then Jonas asked Rollo what made him think of a beetle and wedge; and Rollo told him of the conversation he had held with the farmer's boy. Then Jonas talked a long time about it, giving him particular advice and direction about the plan, though he said he could not himself go and help him then, for he could not leave his harnesses.

The advice which Jonas gave him was, substantially, this:—

"The boy was right in what he said about the necessity of having iron wedges, to split up large logs of hard wood; but you had better have short pieces of pine boards for your logs, and then wedges of hard wood will do instead of iron; for hard wood is so much more solid than pine, that I think wedges of it will answer very well. There are some pieces of walnut under the bench, which will do finely, and I will give you one of them."

"I'll go, now, and get it," said Rollo.

"No," said Jonas, "not yet; let me tell you about making the beetle."

So Rollo stood in the door way, waiting to hear what Jonas had to say about the beetle, but evidently quite impatient to go.

“If you make your wedges of hard wood, it will not be necessary to have iron rings to your beetle, because it will not get battered much, in driving wooden wedges. Now you must go to the wood pile, and look out a piece of round wood, about as large round as my arm, and bore a hole in it.”

“A hole in it!” said Rollo.

“Yes, a small auger hole, to put the handle into. Then you must put the wood into the saw-horse, and saw off the ends, at a little distance from the hole, so that, when the handle is put in, it will be like a mallet.”

“A mallet!” said Rollo. “But I wanted a beetle.”

“Well, a mallet is a small beetle, without rings.”

“Is it?” said Rollo, thoughtfully.

“Yes,” replied Jonas; “and if you work slowly and carefully, I think you can make a pretty good one yourself.”

Rollo thought so too, and away he ran to make the experiment. Under the great work bench, he found, among a quantity of boards and bits of wood, a number of long bars of walnut, which Jonas had split out from the wood pile to keep for handles. He took one of these, and carried it off to the shed, to look for the saw and the hatchet.

The first thing was, as he supposed, to saw off a piece of the wood just long enough for a wedge. But in this he was mistaken. In doing any piece of work of this kind, it is always very important to consider which part it is best to do first. Rollo did not think of this, and so he marked off a piece of the walnut wood about long enough for a wedge, and then sawed it off.

“Now,” said he, “I must make the sides smooth, and sharpen it.”

So he took the piece of wood in his hand, and put one end of it down upon a large log of wood, and then attempted to smooth and sharpen it, as he had seen Jonas sharpen a stake. But he could not succeed very well. The wood was very hard, and he could not cut it. Then it was so short that it was almost impossible to hold it. At almost every blow of the hatchet it slipped out of his hand; and then, besides, he was very much afraid of cutting his fingers; so that, after working laboriously for some time, he came back to Jonas in despair, holding his wedge in his hands, which, however, instead of being properly sharpened, was only rounded off a little at the corners.

“O dear me!” said he to Jonas, as he came up to him with the intended wedge in his hands, “I can’t make a wedge at all. It’s no use to try.” Then he explained to Jonas the difficulties that he had met with.

“True,” said Jonas; “I see. I advise you to give it up.”

“Yes,” said Rollo, “the wood is so hard.”

“O, no,” said Jonas; “*that* is no great trouble—you could easily manage that.”

“But then I can’t hold it.”

“That is of no consequence either. I could tell you a way to hold it well enough.”

“What is the reason, then, why you think I had better give up?”

“Because you have not patience enough.”

Rollo stood silent and thoughtful as Jonas said this, with his piece of wood in one hand, and his hatchet in the other.

“It takes a great deal of patience to make a thing which we never made before.”

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