

"No, it was in the daytime. It was ever so long ago—six or seven weeks, I should think. It was just after we got our second suit of clothes. I was eating on a leaf one afternoon, and busy as I could be, when suddenly there was a terrible noise overhead, a kind of a roar. I looked up to see what it was, and there was a great big face over me, and a big, big voice called out—

"Oh, Katy, see what I've got."

"Then two big fingers pulled off the leaf I was on, and carried it down the tree to the ground, and, oh, how I was jounced! Next I felt myself carried through the air as fast as the wind, until another big creature's face was right in front of me—a creature bigger than the first one, and with lots and lots of clothes on. This big creature gave a frightful scream when she saw me, and jumped back out of the way.

"Johnny, Johnny, you naughty boy," she cried; "throw away that horrid worm."

"Johnny laughed and threw me over by the fence, where some dead leaves were, and how they did hurt when I fell on them! I was so sore and frightened I could hardly move, but as soon as I could I crept under the leaves and hid myself. When I looked out again it was early the next morning, and the sun was peeping through the fence. I started for our apple tree, but before I'd gone far I saw a curled-up brown leaf shaking as though it would go to pieces. It did break in a minute, and the most beautiful and wonderful thing came out. It was something like a caterpillar, only it hadn't any legs. It had six arms, though, like ours, and oh! such lovely wings. They were like two leaves, they were so big, and they were all covered with the most beautiful cloth.

"His wings," Papilio went on, "were weak and shrivelled at first, but as the sun came through the fence and fell on him and warmed him, he spread them out, and pretty soon began to fly from flower to flower. And then I saw that he had a wonderful long tongue, all curled up, that he could unroll and run down into the flowers to suck their juices. He caught sight of me after a little and came up to me."

"You're a caterpillar, aren't you?" he said.

"Yes," I answered, hardly daring to speak to such a beautiful thing.

"I know," he said; "I used to be one just like you, and wanted to do nothing but eat, eat, eat; and such coarse stuff—common apple leaves and that sort of thing. But I got sleepy after a while and shut myself up in a leaf, and that's all I knew for a long time. There was something going on inside of me, but I couldn't tell what it was; and now here I am, and I'm going to have just lots of fun. I'm hungry already for something sweet, and there must be plenty of lovely juices there in that clover field, from the way it smells; so I'll just go over there and get breakfast. Good luck to you, and he spread his broad, shining wings and flew away in the sunshine. And, oh, Dop, I wanted to go with him ever so much; and I think we'll be able to some day, for we'll get our wings, too."

"What nonsense!" said Lepidopter. "You were dreaming. I never saw such a thing, and ain't I bigger than you? You've been eating too many wild cherry leaves, and they've gone to your head. They're too strong for little fellows like you. Get out of my way; I'm hungry, awfully hungry! I haven't had anything to eat for nearly two minutes!" and eat he did with all his might and main.

About a week afterward, however, he and Papilio did curl leaves around them and glue them fast. Lepidopter only knew that he wanted to go to sleep, and thought of nothing else; but Papilio made his little house, fully expecting to wake up after a time with a beautiful body and broad, wonderful wings. When winter had passed, and June of the next year had come, two bright, happy butterflies fluttered about that garden. One of them was Lepidopter, who was a little ashamed of himself as he thought what a blind, dull caterpillar he had been the year before; and the other was Papilio, who was very glad because he had become just what he hoped to be.—*William Forbes Cooley, in The Outlook.*

ANSWERS TO CORRESPONDENTS.

TEACHER (Simcoe).—(1) Will you please give an outline lesson on respiration, suitable for En-

trance candidates? (2) Where can I get a book on nature study?

ANS.—(1) Your questions were received too late for this issue. This lesson will be given in the next science column, May 1st or 15th. (2) "Nature Study," by J. C. Payne, will give you help; but the best text-book is nature itself. Begin with common flowers, insects, and objects surrounding you everywhere. Observe with your pupils, and grow with them. Read the "Butterfly Story" in this issue.

A correspondent without a name asks for questions suitable for primary physics. A paper is given in another column.

BEGINNER says: "I have no apparatus, but I would like to teach a practical lesson by experiment on carbonic acid gas. Will you give me help?"

Get a pickle bottle, a pail, a straw, and a lump of lime, some small limestone pebbles, and some strong vinegar, or, better, a small quantity of any acid.

Place the lime in a small bottle of water, and allow to stand for a day or two, and then pour off the clear liquid into a clean bottle. This is lime-water. Fill the pickle bottle with water, turn it mouth downward into a pail partly full of water. Take a long breath, and, through the straw, fill the bottle with the gas that comes from the lungs. Into this bottle put a glowing splint of wood, also a splint with a flame, also a little lime water, and shake.

Place the limestone pebbles in a saucer, pour on a small quantity of dilute acid, and cover with a bottle, mouth down, over the pebbles. Compare this gas with the last. This will be a start on your lesson. If a mouse has to be killed, its death is less painful by putting it in a bottle of this gas than by crushing or beating it to death, and will illustrate the injurious effects on animal life of rebreathing expired air.

QUESTIONS IN CHEMISTRY.

1. How can I get iodine as (1) a liquid, (2) as a gas?

2. I performed the following experiment, but it was not satisfactory: Heated charcoal; when it was cool put it in a vessel containing NH_3 (gas), allowed to stand. It did not absorb the NH_3 , as I expected it would. Can you direct me?

Bath.

J. MOR GWYNN.

ANSWERS.

1. Iodine at ordinary temperature is a solid. Place a small quantity in a test tube and heat in an alcohol or Bunsen flame. The tube becomes filled with the violet vapor of iodine gas. Iodine does not liquefy on heating, but passes directly from the solid to the gaseous condition; consequently, it cannot be liquefied. You may get a solution of iodine by putting it in hot water and shaking.

2. Put the charcoal in while still hot, cork the bottle, and after a few moments remove the charcoal, and smell. Also try the following: Fill a test tube with NH_3 (gas), put in a piece of hot charcoal and invert over mercury. The mercury rises. Explain.

Special Papers.

PRACTICAL EDUCATION.

What a pity it is that the considerable amount of education that is necessary to qualify one for the profession of a school teacher fails to fit the individual for anything else. In consequence, those who follow this avocation are practically at the mercy of a body of comparatively ignorant school trustees, who are manifestly impressed with the advisability of having a comparatively extensive curriculum, but, for the mere sake of economy, fail to realize that, in order to have effective results, it is necessary to give the teachers adequate remuneration. It must be confessed that our Public School teachers are able to make something like a show of scholarship, as the list of subjects and the marks obtained at their annual examinations attest; but it has been well remarked that, with all this, but comparatively few of them are able to accord to their scholars much of what may be described as practical education, such as shall

qualify them in the most efficient manner to discharge, with credit to themselves and satisfaction to others, the duties devolving upon them in everyday life. In consequence, many people of both sexes who are highly qualified from what may be spoken of as the educational point of view are comparatively ignorant when the education for one's daily life comes to be considered.

A business and mathematical education would be much more useful to most young men than all the classics that can be crammed into them. Skilled labor is in greater demand than ever. In many departments special abilities are demanded which involve not only deftness and dexterity of hand, but a mental grasp of all that is related or contributory to the end in view. The successful manager of a modern plant—indeed, not only the manager, but the individual mechanic—has to understand what a machine can and ought to do. Not only so, but he should be thoroughly posted as to the material he uses, and the bearing of other related products on the one he is handling. Moreover, existing competition demands increasing productive power at a declining rate of time and cost, the best man and the best machine being co-ordinate in modern conditions of manufacture.

We want manual and technical classes for both boys and girls, and, indeed, a change of methods. If we underpay our teachers, we cannot expect them to keep pace with the new conditions; whereas, on the other hand, if we properly compensate them, it may be expected that they will enter heart and soul into the work of preparing the youth of the present generation—girls and boys alike—to become skilled laborers in the fields which are opening up all around, of which the present curricula take comparatively little account. We have spoken of technical education for both girls and boys, but we must add that we fear that, with respect to the former, too little attention is paid to the cultivation of the domestic virtues and accomplishments whose more general exercise would make a wonderful difference in the conditions of the sterner sex, who may more properly be described as the family bread-winners.—*The British Columbia Commercial Journal.*

Primary Department.

PRIMARY COMPOSITIONS.

RHODA LEE.

The picture, rightly used, is truly a valuable aid in teaching primary composition. Several most successful teachers have assured me that they could find no better inspiration to real effort in language than that derived from a good picture. Only a day or two ago one for whose ability as an educator I have the highest regard, when discussing this subject, stated that the best compositions his pupils ever wrote were from a picture which he said he fastened on the door in the morning, allowing the children, at recess and noon, to examine it, and converse about it freely.

Before the little ones can write a story they can tell it. Training them to do this, let them describe a picture which they have at home. I remember the first time I asked my lowest class to tell me a story about a picture at home, either on the wall or in a book; one child gave me a remarkably good description of that familiar picture, "The Young Scholar"; another, "Daniel in the Lions' Den." Good oral training lays the best foundation for written work.

An exercise frequently assigned to little ones is that in which they are asked to write what they see in the picture. This they do in simple statements, such as: *I see a boy; I see a dog; I see a boat*, etc. As an elementary exercise this may be