

NATURE STUDY No. XXXVI.

THE FOUNDATIONS OF CHEMISTRY AS SEEN IN NATURE STUDY.
(FOR TEACHERS ESPECIALLY.)

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In order to teach effectively we must distinguish carefully between the trivial and the important—between the accidental and the essential. We are apt to spend too much of the precious school-time over the details which have little significance—the lifeless husks which enclose and conceal the living germ—thoughts. We think that we must do this in order to be thorough; but we deserve no credit for thoroughness in doing things which should not be done at all or which should be done elsewhere or at another time. Let us rather devote our skill and patience to the development, in natural and logical sequence, of the great facts and principles of nature and of life. Practice and the habit of observation will ensure a sufficient knowledge of details.

At the basis of all the natural forms we see—organic and inorganic—lies the fact of chemical union or combination. To learn to distinguish it, by its effects, from mere mechanical mixture, it is not necessary for the learners to wait until they have become acquainted with the molecular and atomic theories. Only very simple apparatus and cheap material are required for the experiments which follow.

Each member of the class is supplied with a small stick of dry white wood. The sticks are held for a few seconds in the flame of a spirit lamp. At once a soft black substance appears in the heated part of the stick—a substance which will mark on paper and which will be found to be insoluble in water. The pupils recognize this as charcoal which they may be told is a form of carbon. Now the question is, where was the charcoal before the stick was heated? We could not see it before that was done.

It will be found, by holding the hand above the flame of the lamp that no charcoal issues from it—nor does it come out of the surrounding air. Hence it must have been in the stick at first. But why did the charcoal not then make the stick black?