

thought is developed and solidified by the spoken and written symbols, so the desultory and heterogeneous mass of natural knowledge is systematized and crystallized in the text book.

In the study of any branch of science, the student must avail himself of the knowledge that others have gathered and classified for him. He finds himself, like a landsman called to navigate a ship in midocean, with the stars spread above him, the rolling ocean at his feet, and around him the forces lying by which he is to bend the elements to his will. As the landsman would refer to books to guide him—examining the chart to indicate his course and learning to observe the stars and the motions of the heavenly bodies, that he may find his position—so the student of nature must refer to books both as sources of knowledge and guides to lead him in the way of obtaining new knowledge.

But there is danger to be guarded against in the use of books, from the liability to forget that we are using mere symbols of knowledge. Our best text books but imperfectly represent the facts and forces of nature. The same author whom we quoted above has said :—

"Who can point  
Like Nature? Can imagination boast  
Amid her gay creations hues like hers?  
Or can it mix them with that matchless skill  
And lose them in each other, as appears  
In every bud that blows? If fancy then  
Unequal fails beneath the pleasing task,  
Ah, what shall language do?"

The personal observation of the facts and phenomena of Nature are of more importance to the student than all the mere book knowledge he can acquire. By going to Nature he is reading living realities, and forming habits of correct observation which will be of incalculable benefit to him in whatever sphere of action his lot may be cast. In books he meets dead forms representing living organisms and active forces. In Nature he is brought face to face with these organisms and, as it were, made partaker in their life, receiving energy and freshness from the force and beauty wrapped up in the objects which he is studying. The memory is more active. The intellectual energy required to interpret the written symbol is reserved for the memory, and thus the impression left upon the memory is more full and lasting than when knowledge is gleaned from the written page. We refer to books for a knowledge of the principles of language, while all around us flows the continuous stream of conversation whose active forces mould our methods in the expression of thoughts to a far greater extent than the principles we obtain from books. Our knowledge of mental and moral science must depend to a far greater extent on the careful observation of human character as exhibited by the men and women with whom we come in contact than on the study of text books. Even so, in the study of any

science, more lasting knowledge is obtained by the observation of nature than by memorizing immense masses of book knowledge.

But apart from the study of nature as a source of knowledge, it may become a means of combining mental and physical development. The hard mental labour required to master the subjects which we study necessitates a corresponding amount of physical exercise if we are to keep our bodies in good working order. Many of our students get all the physical exercise they require in playing football or kindred games. But some of the most ambitious students in the class room find their physical powers unequal to the contest in these trials of strength. These powers may be developed by taking long walks where they can meet Nature in her most pleasing and instructive moods. Thus a double object will be secured in the development of both mind and body, and the knowledge thus obtained will have a freshness and power about it all its own. The rocks around him will illustrate many of the truths contained in geology. The leafy forest will contain stores of information from which he may obtain a knowledge of botany. The flowing river and the bubbling brook will be graphic illustrations of the forces of Nature and the laws by which they move, while all these combined will lead him to admire the wisdom and beneficence of the great architect of the universe.

And the study of Nature may be made a source of pleasure. We remember the time when, unencumbered with care and unaccompanied with books, we spent hours all alone communing with Nature, fancying that the clouds were messengers of heaven clad in golden sunshine, or looking on the mountains and valleys and hills and glens as ocean waves solidified by some unknown power.

We would not be far astray in saying that all the great discoveries in science and art were made and copied from Nature by men who were careful observers of events in the natural world. The law of gravitation was suggested to Newton by observing an apple fall from its parent tree. The invention of the steam engine resulted from the observation of the power of steam to raise the teakettle lid, and the art of glass-making was first suggested to some travellers by observing the melted sand where they had built their fire on the seashore.

And literary men in all ages have drawn their knowledge from Nature, and turned to her as a source of inspiration. Whether we think of David viewing the spread out canopy of heaven and the countless hosts of earth, and bursting forth in lofty psalms of praise to their Creator, or Virgil writing in polished Latin from his country home at Andes, or our own poet, Cowper, composing beautiful poems amid the hills and woods of Olney; we are charmed with the sweetness, and led to admire the purity of sentiment and freshness and vigor of their literary productions.