

## THE TEACHINGS OF THE EYE.

It is the wise observation of a French writer, who has given utterance to very much that had better never have been written or spoken, that "few men know how to take a walk;" by which I suppose him to mean, that few of those who go forth amidst all the glories of nature, profit as they might from the scenes presented to them. I quite agree with him; and could wish to make a few observations connected with the subject.

In the first place then, as it seems to me, every wise man will more or less, be an earnest observer of nature. How deep a student was David in that school! To him nature seems to have been a great depository, out of which he was every hour drawing materials for his own happiness and improvement. The storm and the sunshine; the moon walking in brightness; the sun rejoicing as a giant to run his race, and sinking to rest in the golden West; the cattle on a thousand hills; the labourer going forth to his work, and returning to the repose of the evening; the rain descending on the new-mown grass; the fruitful field, the golden harvest, the snow on the mountain-top, and the deep fountains of the valleys beneath,—are all subjects on which he loves to expatiate, and he evidently walks among them as the delighted spectator of a theater of wonders, almost as much may be said of him whom I may call his more philosophical and practical son. What a watcher had Solomon been of the ant in her many chambered mansions; and of all the world of plants from the cedar of Lebanon to the hyssop on the wall! And so the Creator, when the world first proceeded from his glorious hand, is described as looking upon it with evident delight, and pronouncing it to be "very good." What poetry is there in the expression, "Let there be light, and there was light!"

How full of imagery drawn from nature is also the language which God is pleased constantly to put into the mouths of his prophets. And thus, also, in the New Testament, the sparrow falling to the ground, the lilies of the valley, the fields white with the harvest, are objects of His notice, and are called in as images to illustrate and adorn His lessons. I need go no further. He who would follow in the footsteps of the holiest of men, and of their glorious creator himself, will be a careful spectator of nature. He will be far from hurrying through its scenes without feelings of admiration and delight. In fact, what an injury do they inflict on themselves who shut their eyes on the beautiful volume which the Lord of heaven and earth has thus thrown open to them. Other beautiful objects, the works of man, the treasures of human wisdom and art are locked up in the museums of the rich and great. But Nature is the universal treasure-house, to which the peasant has as free access as the king. How delightful for the man shut up during the hours of daily toil in the hot and crowded city, or in some low and smoky cottage, to be at liberty to escape for a moment to the green meadow or the shining river, to watch the last ray of the sun, to see the stars kindling in the heavens, till, at last, night spreads out the "brave overhanging canopy" spangled with ten thousand stars.—*Conn. C. S. Journal.*

## SCIENTIFIC ILLUSTRATIONS IN SCHOOL.

The unparalleled progress which the arts are now making, and the intimate dependence of these on experimental science, have given to this latter an importance well known to every intelligent mind. Never before in the history of man has every branch of agricultural, mechanical, and commercial industry received such impulses from this source. Through all the wide range of the arts we can scarcely point to a single department which has not within a short period received important aid from experimental researches in science. Such being the fact, it becomes a matter of importance, that every lad who enjoys the blessings of even a common school education, should receive at least some general instruction in reference to those laws by which the changes in matter are governed.

But how shall these instructions be best given? Can books or oral instruction alone convey to the mind of the scholar a clear understanding of the facts in Nature? No doubt some minds, possessed in a remarkable degree of the power of applying principles, would find the hints given by such sufficient for directing their observations of natural phenomena; but with the majority it requires at least a miniature application in order to so elucidate and fix the principle as to make it of any practical utility. A boy, for instance, may study and commit the whole theory of the action of the barometer, the siphon, or the fire-engine, without a tittle of that comprehension of the cause of their operation which a few well explained and successfully performed experiments with the air-pump would afford. So of the theories of electric induction, the electric telegraph, the refraction of light, &c.,—all are far more readily and satisfactorily comprehended by a few appropriate and well performed illustrations with an ordinary philosophical apparatus.

I say well performed; for a bungling, imperfect mechanical illustration of scientific principles is oftentimes worse than no illustration at all. And on this point allow me to dwell for a moment. While

all intelligent teachers admit the advantages of experimental illustrations of science, few comparatively regard the *successful* performance of such, as an art requiring attention, ingenuity, and a certain degree of mechanical skill. To suppose that every teacher who has studied in a general way the principles of philosophy, astronomy, or chemistry, can go at once before his classes and illustrate with an apparatus these principles, is as absurd as to expect a successful performance upon a church organ from a mere reader of Mozart's compositions. Apt illustrations with instruments, require experience and a due degree of attention. The demonstrator of science who views illustrations with philosophical machines, as he does the production of music from a crank organ, will find himself sadly disappointed in the trial. In illustrating the properties of liquids or gases, for instance, no machines will give satisfactory results in the hands of an indifferent, inexperienced manipulator. In each, there is a score of nice contingencies to be regarded, which only careful observation and experience can remedy.

To operate a nice air-pump as if it were a common water pump, or an electric machine as we would a grindstone—to disregard the extreme tenuity of gases, or the subtle nature of such an agent as electricity, is to insure disappointment and failure. To be sure, some of the coarser and less intricate illustrations may be produced by almost any one, but the nicer and more attractive experiments require experience and skill.

Not understanding *how to allow for results* is often a cause of failure. In the use of the mechanical powers, for instance, the theory as taught in works of natural philosophy, does not regard friction or inequalities in the density of the parts of the levers; accordingly, upon the application of weights to the arms, there is found to be a discrepancy between the theory and the actual result, requiring a little exercise of skill to obviate.

One experimenter will perform an entire course of pneumatic experiments without the slightest accident to the apparatus or failure in the illustrations. Another with the same instruments finds that the receivers do not fit to the pump-plate,—that the stop-cocks leak,—that the glass of the water-hammer is too thin,—that mercury and acids have found their way into the air-pump, where they ought not to; and so each instrument seems imperfect, and each illustration proves a failure. In chemistry, too, the sad results of a want of skill are still more obvious.

Confidence, says Lord Bacon, lies at the two extremes of knowledge. This is especially the case with illustrators of science.

No teacher is qualified to use even the most simple philosophical apparatus before his classes without some previous preparation; and no successful teacher of natural science will fail to exercise his ingenuity and avail himself of the means within his reach, for rendering attractive and impressive the facts he would teach.—*Massachusetts Teacher.*

## ART SCHOOLS IN SWEDEN—GYMNASTICS.

Mr. Brace, an American, travelling in Sweden, writes as follows:—

"In a small Swedish town, you find an evening school where mechanics can learn drawing, modelling, or the practical application of the natural sciences, without any expense. I visited one in Stockholm, in which Mr. Siljestrom is much interested, which was truly a 'School of Art.' There were in it beautiful plaster models of Greek sculpture, and bas-reliefs of Italian statuary, and of the best of Danish bas-reliefs—than which modern art has nothing more pure and classical—beside plaster casts of heads, fragments of limbs, mathematical blocks and architectural ornaments, from which to draw and to model. An original device struck me here, of natural forest-leaves arranged to draw or mould from. All this with lessons and teachers in the arts, lectures on chemistry and the sciences, is open every evening for laboring men and women. The consequence is, as in France, you have a class in Sweden which America has not, of *artisans of taste*—artistic mechanics, men and women, who show ingenuity and a tasteful originality in the manufacture of furniture, the decoration, painting, and frescoing of rooms, the making of common ware and implements."

Another point in which Mr. Brace acknowledges the Swedish school-system superior to that of America, is in the advantages offered to mechanics and laborers. In the United States, Boston and New York are the only places where schools of art have been established, and there, we believe, only for female pupils. At Gottenburg he visited one of these schools for mechanics:—

"The *Chalmerska Skolan* is a higher class of school, being a kind of polytechnique school for laborers and mechanics. Here drawing and modelling are taught, and various natural sciences. There are laboratories, and well-furnished rooms of philosophical instruments connected with it, together with a reading-room. The whole is free for working men! An institution so enlightened, neither New York nor Boston yet has. I visited another school, principally for teaching drawing and designing, intended for the same class."