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THE EDUCATIONAL ADVANTAGES OF NATURAL HISTORY.

In viewing the domain of nature, we are pleased with the beauties which everywhere surround us, yet do not enquire into the cause of this beauty—do not recognise the fact that the harmony everywhere visible is owing to the adaptation of the various animals and vegetables to each other, that throughout the animal, vegetable, and even mineral kingdom there is a perfect adaptation of the *individuals* to the *welfare* of the whole. The distinctions of the animal and vegetable kingdoms were referred to. They both agreed as to possessing life and requiring food; but in the manner of appropriating this they differed—vegetables appropriated this in a gaseous form, or else dissolved in water, while animals by means of organs for changing it from the solid state, to one suited for their requirements. The common sponge was long classed as a vegetable, and even the corals suffered the same fate. The sponge of commerce was in reality nothing but the horny spicules of the compound animal, after the gelatinous matter had been removed by decay. It has been found, not even the lowest orders of animals have an approach to a differentiation of parts; some of them performed their part by removing organic matters from places where it might be offensive, even though it is effected by *cilia* which require the aid of a microscope to become visible. These minute animals become food for larger animals; showing that

"Where the pool stands mantled o'er with green
(To some good end designed): invisible
Amid the floating verdure millions stray."

The structure of vegetables, the means by which they increase in size, by food absorbed by a portion of the cellular fibre, uncovered by epidermis, forming the roots and rootlets, by means of the leaves absorbing carbonic acid gas, which, while fatal to animal life, if allowed to accumulate in the atmosphere to a comparatively small extent, and which is itself produced by the animals themselves at every exhalation from their lungs, is of the greatest importance to vegetables, by which it is decomposed into the carbon, which forms so large a part of their mass, and the life-sustaining oxygen which is thrown off into the air. The form of plants indicated a fixedness; while that of animals is especially fitted for locomotion; so these two great classes of living bodies, the one in a state of rest, the other in motion, and each mutually dependent on the other, either of which if left to themselves, would cease to exist, unconsciously as it were supports the other. A like connection exists between the *herbivora* vegetable eaters, and *carnivora* or flesh eaters; so that from the mineral to the plant—the plant to the herbivora, from this division to carnivora, and thence to man himself, there is a connection—a connection of the most useful nature. The fact that some prey upon others is no exception; if the stately oak in falling becomes the prey of lichens and mosses, as the jay seems to seize for its booty the ruins of some old castle. If the hosts of *carnivora* seem to delight in the wanton destruction of their fellows, it is only to carry out the same end for which the great author of nature has designed disease and decay which pervade both kingdoms, to check the too rapid increase of life, and prevent the earth from becoming to much encumbered for the safety of its inhabitants.

The contemplation of these ties, which bind all parts of the animate creation, must surely command our admiration, and lead us to exclaim, with respect to its author, "How manifold are thy works, in wisdom hast thou made them all!" If we would find matters of interest, where can these be more easily found than under our feet—where they do occur whether we notice them or not. The professor here exhibited some drawings, illustrating various contrivances for meeting the particular wants of plants and animals. Amongst the examples given we may notice the various "fly-traps" which some plants possess. These traps are either like a rat-trap, (on the invention of which the lecturer made a very happy allusion), or like the common pitcher plant of our own locality as to shape. The flies and other small animals, on decomposing, furnish nitrogen to the plant, which it needs. Where animals were without teeth, their place was supplied by other contrivances. The ant-eater thrusts its long tongue into the ant-hills, when its mucilaginous covering attracts and holds fast a great number of ants, which are with the utmost coolness drawn with it into the mouth and disposed of, while its scaly covering protects it from the annoyance of the animals referred to.

The wanton destruction of birds* which devote their lives to our interests, such as swallows, and others which only threaten us with injury for short periods, and by taking advantage of their natural timidity may be kept from doing us much damage; the best of their time is employed in destroying the farmer's worst enemies. By understanding the history and habits of those animals which destroy

* See page 58.

our crops and injure the domesticated animals, as well as the nature of the means to be employed in exterminating them, and by knowing the nature of the diseases which attack our vegetables, we are much better prepared to defend our property, less likely to be robbed of the fruit of our labours than if we continue to be the victims of our own ignorance, and are plundered without knowing how to help ourselves. Surrounded by so many beings, both animal and vegetable, which may be made, by ignorance of their properties, to become injurious to us, we should aim at acquiring a knowledge of these, so as to render them on the contrary beneficial.

In conclusion, if even without instruction, we feel the charm of natural scenery, we are delighted with the brilliancy, grace and beauty of the flower, in the elegance, the picturesque effect, or the majesty of the tree. The more we know the more these pleasures are increased by the perception of reason, and the appreciation of variety and conformity to a common type amidst its various changes. The ignorant are brutalized into indifference to the charms which affect the childish and even the savage nature; they even become wanton destroyers from the love of mischief which accompanies and marks want of intelligence and proper occupation for the mind. Cultivation brings our faculties into harmony with nature. Beauties before unthought of rise to our view. The various forms and colours around us, the relations of the vegetation to the soil and situation, the habits and instincts, the services and injuries of living creatures—all rouse our curiosities and engage our attention, exercise our ingenuity, and contribute to our gratification. Where the boor wanders along in listless indolence, or seeks excitement in destroying what others admire, or in degrading indulgence—he who has tasted the knowledge and imbibed the love of nature finds every changing scene and aspect a source of new pleasure. He has exercise and occupation for his faculties, perpetual variety and novelty, frequent opportunities of discovering and applying what is useful, an exhaustless field of interesting inquiry, an exhaustless spring of rational, refined, and innocent enjoyment. We do not think it possible for any one to consider the relations established by the author of nature, between the different beings he has formed, and between man, the chief of His works, and all the organized beings which surround and are subject to Him, without arriving at the conclusion that the knowledge of nature is one of our most interesting, ennobling, and useful pursuits; that there are few branches of study which contribute so much to cultivate our faculties and prepare us for the business of life; that there is no branch of knowledge which does more to counteract the evil influences to which we are exposed in the world, and to give a right direction to our thoughts and affections; and consequently that nothing can be more suitable or valuable as a general subject of study—nothing better fitted for the purpose of education, or forming a better preparation for the active duties and practical pursuits which must engage most of us in the world.—*Barrie Paper.*

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EDUCATION—WHAT IT INVOLVES—EXPEDIENCY OF STATE INTERVENTION.

I would call your attention to the fact, that great mischief has accrued to the cause of education by the misunderstanding of its meaning—its definition. Because education is derived from the Latin word "*educio*" to draw out, it is assumed that the process of education is one of drawing forth or developing certain seeds of knowledge lying dormant in the young mind. According to this view, education is the sunshine under the benign influence of which the "young idea shoots," and the phrase "he has it in him," is used to express the character of one in whom those seeds appear unusually likely to germinate luxuriantly. But the fact is, there are no arithmetical, nor geographical, nor grammatical seeds in any child's mind. Education is not the cultivation of a spontaneously growing crop; it is much more—it is *preparing* the soil, *sowing* the seed, and *destroying* the weeds. The best educator is one who possesses the best mode of laying facts before the youthful mind in such a way as will give exercise to the reasoning faculties. You may find many boys whose heads are crammed with facts and figures, and yet owing to the mode in which these were imparted to them, the facts profited them nothing; they were not taught to compare them, to infer anything from them, in short to reason upon them. Hence it is that I think the above the best definition of education so far as the intellect is concerned. The imparting of facts does not constitute education. By the repetition of certain acts and sounds, we may train a horse and teach a parrot, but if we educate a man, we must teach him the nature and process of reasoning from facts to facts. This, however, is only a definition of education considered as applied to the intellect: there is, besides, a power in the child's mind with which education is intimately concerned; I mean the will. That will has good and bad tendencies, and education as applied to it, may be defined as the development