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SCHOOLS OF OBSERVATION.

With all their changes for the better which the work of our primary schools has undergone of late years, it is still ingeniously perverse in its methods and barbarous in its aims; almost hopelessly so, for so great is the conservatism, the inertia rather, of these schools that they not only withstand any radical improvement from within, but make such improvement all but impossible in the higher schools also.

Every college professor—still more every teacher in scientific institutions—complains that the youth who come up to him for instruction have been, as a rule, so blunted in sense and intellect by a vicious preparation, so fixed in bad habits of thought, that more time has to be spent undoing and redoing the work of the lower schools than is left for genuine college work. Thus the whole weight of the elementary school system, and it is great, bears dead against the improvement of the upper schools, wherein unfortunately all educational reforms have to begin.

Hence we see the colleges tardily adapting their work to the needs of the times, the high schools tardily following the example of the colleges, and the primary schools bringing up the rear a century or so behind: behind the colleges that is; they are twenty centuries behind the discovery and announcement of their proper work by thinkers independent enough to break with the tradition of their day. There is not a common school or an elementary private school in the land that approaches in its mode of operation the ideal of youthful culture set down by Plato: not one that does not violate, more or less atrociously, the primary requirements of young humanity in its entire scheme of operation. And yet we flatter ourselves that our schools exemplify the finest fruits of modern civilization!

We marvel at the logical blindness of our forefathers, who sought for personal freedom, yet could not see the absurdity of trying to erect a free government on a foundation which had slavery for a cornerstone. To those who shall celebrate the second centennial of our country's existence, we of to-day will probably appear quite as illogical in educational as they were in political matters. We know what should be done, yet submit to the habitual performance of the opposite. We brag about the school of marine observation which Agassiz set up at Penikese, and say: "That is the way a school

should be conducted." We cry "well done" and "God speed" to Professor Shaler for the projected school of inland observation to be camped next summer at Cumberland Gap, looking upon such enterprises as the proper outcome of the best system of public education in the world. And we are blind to their biting satire upon our entire work of instruction!

Just think of it. We take our children at the age when observation is instinctive, when every sense is keen and hungry, the whole world fresh and new, and every object and phenomenon a challenge to their curiosity: when "what is it?" "what for?" and "why?" are the burden of their speech, and "what are you?" "what can I do to you?" "what can you do to me?" the language with which they approach all things: we take them at this stage and—aid and encourage their attempts to master their environment? Not a bit! On the contrary we shut them up, literally as well as figuratively, at home and in school. "Don't bother me with so many questions!" is the mother's response to incessant queries. "It isn't polite to ask questions" is the reproof a child gets when it turns to strangers for the gratification of a curiosity, sure to be impertinent if unwisely repressed where it should be wisely guided. "That has nothing to do with your lesson: attend to your book" is the teacher's reply when the eager child wants to know about something not set down in the day's exercises.

The fruitless quest is not long persisted in. The mind, even of adults, soon wearies of rebuffs; and the naturally bright and observant child, under such treatment, soon settles down to a listless indifference to all but a narrow round of facts and phenomena, or wisely keeps his observations and doubts to himself. If studiously inclined, he studies books, gradually learning to rely on other people's experience and to seek for knowledge of the world through the distorting medium of words. Language becomes the only instrument of intelligence or culture; and his powers of original perception, at first undeveloped, end by being stultified by years of unobservant going to and fro. And then we set before him the happy chance of becoming one of the twenty-five or fifty lucky fellows who are permitted to supplement their college life with a six months' training in a school of observation!

Give to Agassiz and Shaler all credit. The Penikese and Cumberland Gap schools are germs of a new life, destined, it is to be hoped, to develop downward till, by the time our great-grand-children are ready to go to school, the whole school system will be leavened. But to ourselves we must reserve unlimited discredit for permitting such a "reform" to be possible. Schools of that sort are properly not the crown but the basis of a sensible educational system. What they propose to do should be made unnecessary by the work of every primary school, for childhood is the time for cultivating the art of observation, when everything in Nature and Art is new and open to discovery: not after a quarter of a lifetime has been spent in habitual inattention to all save books, when a shadowy familiarity has bred such contempt of common things that the would-be observer has to resort to the wilderness or to the bed of the sea for objects to excite his dormant curiosity.

THE ANTIQUITY OF LIFE.

When Lyell and the rest of the uniformitarian school of geology began to attribute all geological changes to the protracted operation of the influences now remodeling the earth's surface—sunshine and showers, rivers and seas, arctic frosts and tropic heats, slow risings and sinkings of the earth's crust, with their attendant quakings and volcanic outbursts, the growth of vegetation and the slowly accumulating deposits of coral polyps and other forms of animal life—it was objected that time was too short for such proceedings. Men had scarcely begun to question Usher's six thousand years of Biblical chronology, and their imaginations were incapable of spanning monotonous milleniums marked by no catastrophes. The Niagara could not have carved its six mile gorge at its present rate, for that would leave no time for antecedent operations!

By Darwin's day, such objections were worn out. Men had become accustomed to granting hundreds of milleniums for the periods of the geologist; yet they stood aghast at the demand for more. Geology had been modest in its requirements compared with the rising science of biology. Allowance was asked, not merely for the geologist's rock-recorded ages, but for gaps in the record for pages destroyed, and for measureless periods during which no records were kept in parts accessible to man. Darwin's theory called for an extension of time compared with which that of the geological record was small; and his opponents refused. A theory, they said, which requires such boundless concessions of time cannot possibly be true.

Now we learn that, whatever objections may be urged against the evolution theory, lack of time for the slow development of creation is not one of them. The soundings of the Challenger expedition give a clue to ages of life whose duration dwarfs to insignificance that of the periods between the Lower Silurian and the present, the limits formerly set for the duration of life upon the earth. The addition of the vast periods covered by the deposition of the many thousand feet of Cambrian and Laurentian rocks, with their shadowy traces of life, does not bring us sensibly nearer the beginning; nor is the light they hint of any guide to a comprehension of the swarms of living things which sported in the waters of those primeval oceans, or inhabited their shores.

We have given elsewhere a resumé of the grounds on which Professor Wyville Thompson and his colleagues base their belief that the red clay, which covers such vast areas of the deeper ocean beds, is a residuum representing less

than two per cent of the mineral matter of the microscopic animal and vegetable life which inhabits those waters; and that it is identical with the basic clays of the extensive azoic formations known as slates, schists, and even gneiss and granite. If this position is sustained, as there is reason to expect it will be, by further observation, the antiquity of life surpasses the most extravagant demands of biologists; even the oldest known rocks, the fundamental granites as they have been considered, cannot be taken as sufficiently ancient to mark the time when life first made its appearance on earth. We must say of the organic as Hutton did of the inorganic world: "We find no vestiges of a beginning": for the farther back we go, the vaster are the measures of life's duration, and their number is countless.

The slow development of a thousand feet of coralline limestone covers a period not incomputable, however vast. Something like an approximate estimate can be made for the time required to deposit a thousand feet of sand in a lake bed or along a sea coast. But what arithmetic can number the ages required for the deposition of thousands of thousands of feet of the basic material of rock which at most can represent in its mass not much more than the hundredth part of the mineral constituents of animal and vegetable life, so minute and so distributed that it barely tinges the deep sea water with a shade of green?

If the great deposit of red clay, now forming in the eastern valley of the Atlantic, were metamorphosed into slate and then upheaved, says Professor Huxley, it would constitute an azoic rock of enormous extent; and yet that rock is now forming in the midst of a sea which swarms with living beings, the great majority of which are provided with calcareous or silicious shells and skeletons, and therefore are such as, up to this time, we should have termed eminently preservable. He might have added that the sea whose bed is so barren in organic remains lies between continents abounding with highly organized animal and vegetable life, with ancient cities, imperishable pyramids, and countless other traces of a higher than animal existence. Yet were the present continents submerged with the supposed elevation of the azoic sea bed, the geologist of that period might say—as our geologists have been used to say, under similar circumstances—"the earth was void of life when these slates were laid down!"

Who shall say that higher forms of life could not have inhabited the shallow seas and the dry lands surrounding the deep seas wherein our "primary" rocks were deposited? Who shall say that the vestiges of higher life discovered in the comparatively recent "fossiliferous" strata afford anything like a complete history of life on earth, or deny to the student of biology unlimited time for bringing about the results he observes?

DANGEROUS HOUSES.

Four deaths from diphtheria, recently occurring in Brooklyn have attracted the attention of the health authorities of that city to the condition of the house in which they took place. The report which a sanitary committee made upon the dwelling sounds a note of warning which is certainly timely at this especial period when moving is everywhere in progress. The house in question was new, and damp in every room from cellar to attic, for there appears to have been no effort made to dry the walls. This is precisely the condition of scores of dwellings into which families have entered on the first of this month; and unless proper precautions be taken, further cases of illness and death will be the cost of neglect.

If any reader of this journal, therefore, finds himself located in a dwelling on the walls of which the moisture condenses in beads, as on the outside of an ice pitcher, or the rooms of which cause a chilly, damp, sensation, with a strong odor of plaster, or any portion of which does not, on wall, ceiling, or floor, feel perfectly dry to the hand, let him, as he values his own life and that of his family (or hopes to escape from rheumatism, lung and kidney diseases, and the like) start fires at once. Better waste a few tons of coal than pay five times the amount in doctors' bills or a still greater value of the money in suffering. Build a big fire in the furnace and in every grate, and keep all up night and day; and if the weather admits, throw open the windows and doors, but keep out of the drafts. The object of the fires is to dry out the walls, not so much to warm the rooms for comfort. Then as the weather becomes warm, let all go out but the furnace, retaining that until its use becomes a discomfort.

We offer these suggestions to persons who have already moved into new houses, but of course it is much wiser not to enter a dwelling that is not thoroughly seasoned. In all cities, blocks of houses are constructed, of the flimsiest materials, in incredibly short spaces of time, for spring occupancy. Many of these have been frozen from top to bottom during the recent severe winter; and instead of the water drying out, it has remained in the walls in the condition of ice. In an ordinary three-story house, 30,000 gallons of water are absorbed by the brick and mortar used in the construction; and this immense quantity must all or nearly all be got rid of before they are safe as dwellings.

THE COMING ARCTIC EXPEDITIONS.

The arctic exploring expedition which has been projected by the English government, and which for some time past has been fitting out, will, it is stated, sail from England on or about the first of June. Two vessels, the Alert and the Discovery, commanded respectively by Captain Nares and Commander Markham, have been rebuilt so as to be immensely strong and fully capable of withstanding the severest ice nip. The sides are composed of three thick skins of solid oak, each five inches through, and iron girded tiers of beams run all around the interior, which is finally lined with