

educational influence is very limited. Their technical and abstract character unfits them for the office of awakening in immature minds an interest for intellectual pursuits. Persons who are naturally inclined towards abstract studies, the least need to be urged upon them by extraneous means, because faculties which are inherently active are sure to become fairly trained by the usual incidents of life. It is those powers which are inherently lethargic and inactive that require to be "led forth" and exercised by eternal aid. Mathematics, therefore, in ordinary school and college practice, furnish what is superfluous, but fail to supply what is requisite. The world is full of one-sided eccentricity, and comparatively void of well-balanced character and well regulated intellect and reason, mainly because individuals are commonly condemned to be taught only that which they manifest a predominant capacity to learn.

The applied sciences on the other hand, are no less remarkably fitted for the business of education, because they lead to abstract generalization, through illustration. They excite interest by awakening the sense of wonder, and so convert details, otherwise dry and wearying, into pleasurable and gratifying objects of study. Nature herself operates by first arousing in the child powers of observation and then developing habits of reflection. Education should steadily follow the example set by nature. This, then, is one strong argument for the employment of the physical sciences in the work of teaching.

But another no less important ground for their employment in this service is found in the fact that they educate the mental powers by useful "instruction." They furnish valuable information, while they train the perceptive and reflective faculties. This happy characteristic is peculiarly instanced in the case of physiology. While the pupil is exercising his intellectual powers by the study of this science, he is actually acquiring knowledge which gives him dominion over the earth, the air, and vegetable and animated creation;—he is actually learning how to make two blades of grass grow where there was only one before; how to guard himself against that worst of all physical evils, bodily infirmity and sickness; how to afford the corporeal organ, upon which mental and intellectual growth depends, the fairest play for the fulfilment of its purposes; and how to extend the most surely and the most widely the same substantial blessings to his neighbours, after he has acquired them for himself.

Physiology indeed serves as the best possible introduction to the physical sciences at large, because it exhibits most of them occupied in some kind of practical work. It shows the chemical affinities and mechanical forces of matter evoking the most startling results. It presents the meteorological powers laboring in their manufactories and storehouses. It shows fluid pressure distributing nourishment to contractile muscles and sentient nerves. It presents elastic and aerial vibration, taking effect as speech and hearing. It shows heat effecting vital transformation and favoring vital movement. And it presents light, painting sensible pictures upon the curtains that immediately screen the innermost shrine of rational being. If it were not for the fact that the several sciences are inseparably intermingled in their relations,—heat, electricity, light, and gravitation, for instance, being involved in chemistry, and chemistry in its turn, in physiology,—the obvious method of employing the sciences in education would be to commence with those which are principally based upon observation, proceeding afterwards gradually to those which depend more and more upon reflection, and which are more exclusively of an abstract and inductive character. As, however, the several sciences are thus intermingled, and mutually illustrative, the only course that can be pursued is, to approach as nearly as circumstances permit to this rational method, teaching first those matters which depend most on observation and least on induction, and proceeding ultimately to those which have least to do with observation and which depend most upon induction.

Astronomy does for the highest province of inductive knowledge, what physiology does for the range of the less abstract physical sciences. It serves as the best possible introduction to the pure mathematics. It exhibits them occupied with the very interesting work of weighing and measuring suns, scrutinizing worlds, and mapping out the regions of the pathless immensity. That it really does hold this position in relation to the mathematics will become obvious if the following simple experiment be tried. Let two boys of average intelligence, be taken indiscriminately, and let one of them be told that the length of the side of a triangle can be found by calculation, if the measure of another of its sides, and the amount of two of its angles, be known, the formula for the process being set, step by step, before him. Then let the other have his attention directed towards the moon, as a visible body floating out at some distance from the earth; and let him be shown that if it be looked at from a remote situation, it will be made to seem in a different place among the stars; and that in consequence a triangle will be formed by the two lines of vision, which has the interval between the places of observation for one of its sides, and the convergence of the two lines at the moon for its apex; and that it is possible to ascertain how far the moon is off, by

comparing the relations of these parts of the triangle. In the first case it will be found that the boy will take the earliest available opportunity to escape from the lesson, and will do all in his power never to resume it; while in the second case he will prolong the explanation by his questions, will try experiments of his own on the influence of parallax, will think over the matter again and again when left to himself, regarding the moon and stars on each successive night with increased interest, and in all probability will, at some future time, voluntarily return to the subject as a theme for further conversation and enquiry.

But while astronomy thus proves itself a familiar and pleasant introduction to the highest form of inductive and reflective discipline, it also exerts special influences of its own which are of inestimable value to the rational creature. It renders the judgment modest and hesitating in the assertion of its conclusions, by bringing the finite face to face with the infinite, and by exhibiting the sphere of positive knowledge so much more vast than the individual capacity to know. It makes the mind tolerant of uncertainty and doubt, by keeping present to it the sense that there must always be much in so wide an universe which the human intellect cannot grasp, and thus guards it against the danger of being pressed by its own impatience into forming fancies when it cannot see facts. And while doing this it also expands the intellect by familiarizing it with the thought of the limitless immensity of nature, and the faultless perfection of the physical arrangements of the universe.—*English S. S. Tea. Mag. and Journal of Education.*

MORAL DETERIORATION TO BE CHECKED BY RELIGIOUS EDUCATION.

No nation has ever yet long survived the moral element of greatness, however vast its wealth, or extensive its dominions. In the Eastern and the Western World lie the ruined remnants of nations of mightier prowess and more advanced civilization than ours. The plains of Nineveh and the tangled forests of Yucatan teem with the mouldering and mysterious monuments of national grandeur of which history is silent, or but dimly shadows the existence, whilst it oft proclaims the rapid downfall of later empires, whose overthrow resulted from their moral decadence. We have no prescriptive safeguard of a less perishable vitality. We have now reached a crisis in the career of England, in which education will in all likelihood determine our future fate. The Prussians well say that whatever you would have appear in a nation's life you must put into its schools. Our teachers are the apostles of our common weal. On them depend the upward or downward tendency of our times. No system of mere school discipline can perfect that education, which, concerning itself for the entire body, and all the powers, feelings and faculties of human life,—can alone satisfy social interests, and the vital requirements of these times. If teachers be mere scholastic instructors, and wanting in that whole-souled energy essential to the educator—if they draw a narrow circle round their duties,—and strive not with might and main to throw the sympathetic force of mind and heart into their work—they will never ascend that throne of homage and love, whence they can alone wield the influences which touch the soul and expand the intellect of childhood. That teacher little knows the power he loses who slights the affection of his scholars. It has been well said that if they love him he stands forth as their idea of an heroic nature. Long after his lessons are forgotten he remains in their memory a teaching power. It is his own forfeit, if by a sluggish spirit, a callous heart, a brainless mind, or a coarse manner, he alienates that confidence and disappoints that generous hope. But the good trainer must also be what he would have his pupils become. Candour, generosity, diligence, charity, truth, kindness, are virtues which no teacher can impart in whose *own life* their glory never gleams. The graces he would instil, and the power he would exert, must spring from that religious reality and fervour which can affix the seal to his high vocation, authenticate his mission, and make him the minister of that Lord of Lords and King of Kings, whose unerring laws can alone insure the welfare of peoples and the permanence of empires.—*English Journal of Education.*

ON THE INCENTIVES TO THE PURSUIT OF KNOWLEDGE.

The law stamped upon man's moral nature, is progress. We cannot stand still one moment. The present is a fiction; the past and the future exist only for us. Our minds are continually reverting to the past with sorrow or satisfaction, or contemplating the future with despondency or hope. We may not be wiser to-day than yesterday, for knowledge is not wisdom; but still we know more, and knowledge is the foundation on which we build wisdom. The bubble that then glittered before us, in the splendour of sunlight with hues of crimson and gold, has burst, and we find but a drop of water. Our prejudices are constantly decaying, and our pleasures losing their fascination. The need of sixteen moves the ridicule of twenty; and the scepticism of twenty the pity, perhaps remorse, of sixty. The career of one man