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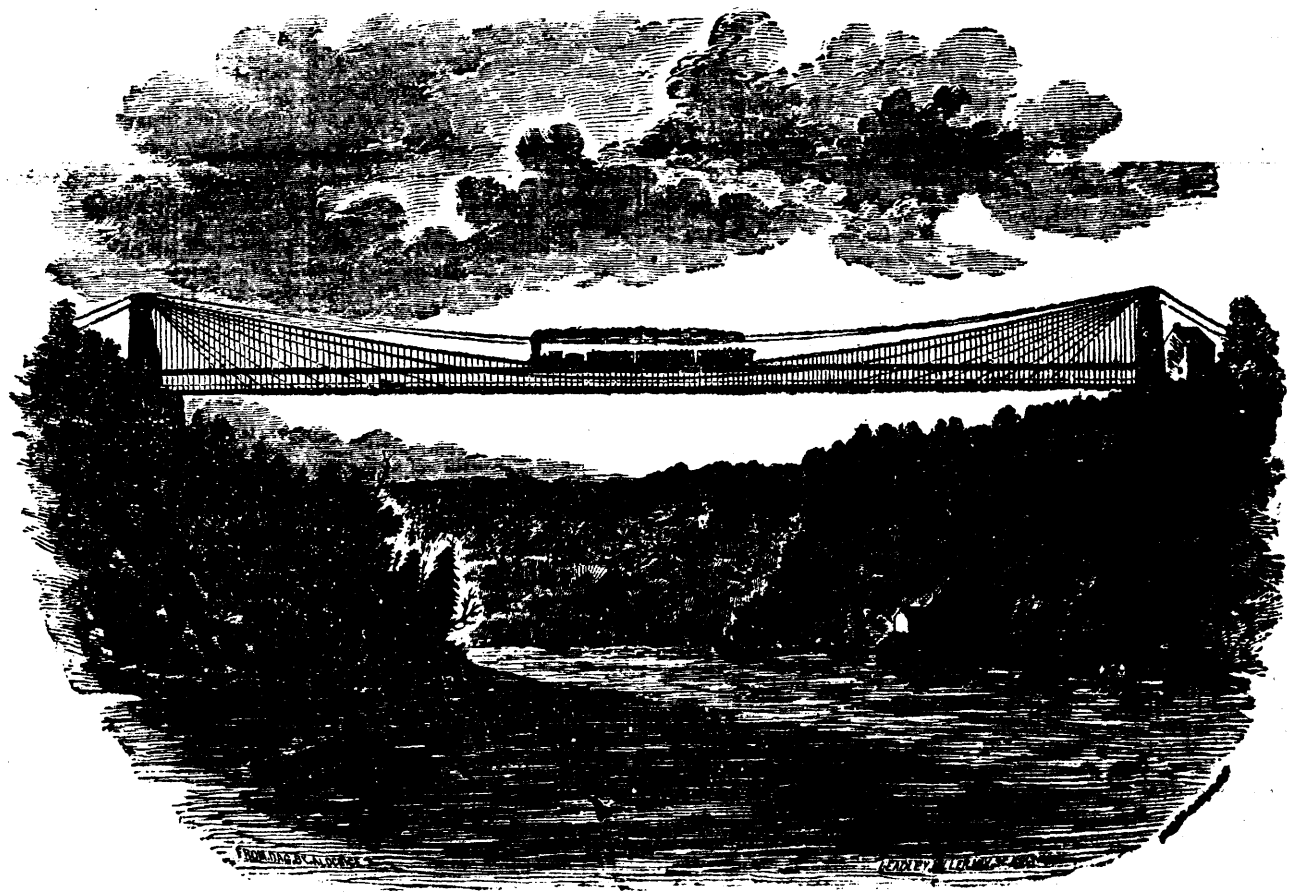

THE NIAGARA SUSPENSION BRIDGE.

The International Railroad Suspension Bridge—one of the most magnificent structures of the kind in the world—was erected in 1853-4, and was designed to connect the Great Western Railroad of Canada with the railroads of the State of New York. The bridge spans a narrow part of the Niagara river, two miles below the celebrated Falls of Niagara, and three-quarters of a mile from the Whirlpool. The east end of the bridge commands a fine view of the Falls, and of the rapids under and below the bridge. The water of these rapids, where

the river gradually narrows, runs at the rate of twenty-five miles an hour, with breakers dashing and foaming in the current. The efforts which have been made to fathom the river at this point have been unsuccessful.

The accompanying admirable representation of the Niagara Suspension Bridge, is the only true one which has yet been published. The point of view is on the American, or right bank of the river, looking down the stream. Under the bank, above the bridge, may be seen the little steamer, "Maid of the Mist," which plies between that place and the Falls; while further down the stream, and close beside the grand structure, may be seen the building which contains the wheels of an hydraulic power used in driving a mill. This mill is built of stone, and situated upon the upper bank, to which an immense and extended line of shafts is led up the precipitous acclivity from the water-works below.

Far above the water—stretching over the fearful chasm, and apparently suspended by gossamer threads, whose graceful curves describe lines of true sublimity as well as beauty—appears the last great triumph of human genius and engineering skill. The distant observer is struck with surprise at its apparent frailness. Everything in nature, which surrounds it, is in such majestic proportion, that the bridge itself seems a mere network of threads and lines, buoyed up by its own inherent lightness, and the elasticity of the surrounding air. And yet, when we descend to a mathematical calculation of its size and materials, its strength and capacities, we feel that even its grace and beauty is lost in its great utility.

The bridge is sustained on four towers,—two of them 88 feet and two 78 feet high. From the base of the towers to the outside enclosure of the bridge, at either end, the ground is nicely laid out and planted. Thus strength, beauty, and sublimity are united. The anchorage of the towers is formed by sinking eight shafts into the rock, 25 feet deep. The bottom of each shaft was enlarged for the reception of cast-iron anchor plates, of 6 feet square. These chambers have a prismatical section, which, when filled with solid masonry, cannot be drawn up without lifting the whole rock to a considerable extent. Saddles of cast-iron support the cables on the top of the towers. They consist of two parts—the lower one stationary, and the upper one moveable, resting upon wrought-iron rollers. The saddles have to support a pressure of 600 tons, whenever the bridge is loaded with a train of maximum weight. The compact, hard limestone, used in the masonry of the towers, will bear a pressure of 500 tons upon every foot square.

The following table exhibits the proximate, if not the absolute, capacities, dimensions, and cost of the Suspension Bridge:—

Length of span from centres of towers	882 feet.
Height of tower above rock on the American side	88 "
" " " Canadian side	78 "
" " floor of railway	60 "
Number of wire cables	4
Diameter of each cable	10¼ inches
Number of No. 9 wires in each cable	3,659
Ultimate aggregate strength of cables	12,400 tons.
Weight of superstructure	800 "
" " and maximum loads	1,250 "
Maximum weight cable and stays will support	7,300 "
Height of track above water	258 feet.
Base of towers	16 ft. sq.
Top	8 "
Length of cables	1,256½ feet.
Depth of anchor pits below surface of rock	20 feet to 80 feet.
Outside width of railroad floor	24 "
Total length of wire in miles	4,000
Cost of structure	400,000 dollars

The passage-way is divided into two parts, or floors—one above the other. The upper is used for the transit of cars, and admits of three gauges, viz., the New York Central, Great Western (Canada), and the Canandaigua and Niagara Falls—the latter being the New York and Erie gauge. The rails of two of the roads are so laid, that one of each track forms the third—and this saves the necessity of multiplying rails. The lower floor is the passage-way for pedestrians and for carriages.

Neither the cost of the bridge nor the magnitude of the undertaking is a matter of surprise or wonder. There are very many mechanical structures, even in this country, already completed, which cost immensely more money; and the tubular bridge at Montreal, now in process of erection, will exceed it in this respect more than twenty times over; but it is the boldness and the originality of the adventure, and its complete success, in the face not only of natural obstacles, but also of the discouraging prophecies of the most celebrated scientific men, which render it remarkable.

The distinguished English engineer, Stephenson, is said to have pronounced adversely to its security; and the public generally regarded it at the best as a very doubtful experiment. But that experiment has proved eminently successful; and thousands of passengers, with immense quantities of freight, pass over it daily, and in perfect security.

The beauty and grandeur of Niagara and its neighbourhood are by no means felt and enjoyed without a special visit to this great triumph of the professional skill and ingenuity of John A. Roebling, the engineer.

It is said that there are now few points in Canada or the United States where a larger custom-house business is transacted than at the Suspension Bridge. The amount of duties collected from December to the period in March when the Reciprocity Treaty went into effect, was $50,000. The imports into Canada, from December to May, were $125,000. The amount entered as in transition for Western States for the same period was $12,000,000. The amount of foreign bonded goods passing into Canada at this point, from January to May, was $2,000,000. We must also add that during the winter months 150,000 barrels of flour were sent through, in bond, to New York. It must be borne in mind that the Railway Bridge was not opened until about the opening of navigation, and as last winter was merely initiatory to the business, which will hereafter be transacted at this point, some idea may be formed of what will be done the coming winter. The business is largest of course during the winter months.

[For the New York Commercial Advertiser.]

THE FALLS OF NIAGARA.

Much has been written in relation to the Falls of Niagara, and in reference to the probable length of time they have existed. It is less than three hundred years since this stupendous waterfall became known to civilized man. It is situate in the bosom of a plain, about equi-distant between two great lakes—Erie and Ontario, in a river thirty six miles long.

One thing is certain, and that is that it could not have existed prior to the universal deluge; and from that great event to the present time, is not half as many years as some imagine these Falls have continued. I have made several visits to the Falls for the purpose of geological exploration in connection with the examination of greatly extended districts in every direction around them.

On my first examination of the Falls, in descending the cliff from the Clifton House, by the boat path, on the Canada side, I came to a point exactly opposite the American Falls. Here I worked among the rocks for a considerale time, and on turning to the left, on the the very margin of the water, I found a strata of red and green shale, underlying the entire limestone cliffs, and extending to and under the "Horse Shoe Fall." This strata also extends across the river and under Goat Island, and many miles in every direction. It is the same strata in which the salt wells of St. Catherine's were sunk, and the same as forms the cliffs of the Niagara, at and above and below Queenston and Lewiston. It is a fractured and shattered strata; contains water as dense and as salt as the Sea of Sodom; and abundance of mineral waters and elastic gases of great force. This strata is the foundation of the great limestone walls which form the great cataract of Niagara—a frail structure it is, and it is in this strata that the Niagara has the whole of its bed below the Falls; and, being soft, the water which falls over the Horse Shoe and over the American, north of Goat Island, has had no difficulty in sinking chasms of vast depth, into which the broken rock of the limestone walls, which compose the cataract, falls.

I have examined minutely the entire saline district of that portion of the continent,—the borings of the deep wells at St. Catherine's, at Clyde, Lockpit, Montezuma, Geddes, Syracuse, Salina, Liverpool, Little Soda Bay and Canastota, and the Salt Springs in the wilderness between Lake Ontario and the river Ottawa, in connection with the great chain of lakes which discharge their surplus waters through Oswego on one side, and the Trent on the other side of Lake Ontario river, with that great volcanic basin in which Lake Ontario has its bed. The northern shore of Lake Ontario, where the bituminous fossiliferous limestone strata exists, was an ancient *salses*, and since 1844 has three times been excessively convulsed, producing a tidal flow over the land for many rods, and a subsidence of the water from the shore for a great distance. One of these occurred on the 20th of September, 1845; another on the 8th of January, 1847; and the other on the 5th of July, 1850. Each was accompanied by terrific storms of thunder, lightning, and wind; and one of them—that of July 5th, 1850—was attended by a water-spout of great power, which moved over Lake Scugog, and at one time threatened to drain it of its water; but in a moment a cloud of most dismal blackness arose, and from it issued a vivid discharge of electric flame, attended at the instant by a fearful crash of a broken thunder bolt. The spout fell at the instant—it was broken; the cloud was sundered by the struggle, and instantly winged its way in different directions—one part passing to the east, and coming to the ocean by way of the Hudson river and its tributaries; and the other passed down the St. Lawrence, to Quebec, and thence to the ocean—and having thus filled its circuit in the sea of waters, was at rest.

Water-spouts are of frequent occurrence in Lake Ontario, off Sodus Point, where the water is very deep. The great lakes seem to have a subterranean connection with the volcanoes of Hecla, in Iceland. They were also connected with the phenomena of the great earthquake at Lisbon, which occurred on the 1st of November, 1755, and were excessively agitated at the time of that disastrous convulsion, which was felt on all the yet discovered continents of our globe.

The red and green shale underlying the Falls of Niagara, contain saline waters that act upon it with great energy. A large stone-jug of this water—which is as dense as the water of the Dead Sea, and as bitter and acrid—was sent to me from the well at Lockpit. When the canal boatman brought it to the city, in warm weather, it condensed the atmospheric air so rapidly on its surface, as to make a large puddle of water on the floor where it stood. On removing it to my laboratory, where there was much heat at the time, it again condensed the atmosphere so rapidly as to wet the floor to an extent that made it necessary to remove it. I emptied this saline fluid into lead and glass vessels, in which it now is, but the empty stone jug is now half of it in dust having been decomposd by the fluid. I now use this sensitive water for the condensers of my meteoric wires, and Dr. Kane has taken a bottle of it to the North pole with a view of ascertaining what effect the cold of the arctic pole will have upon its fluidity. Here, a zero temperature produces a large chrystaline deposit, which, on a change of temperature, produced effervescence beneath the fluid. During certain electric conditions of the atmosphere, the saline properties of the water are conducted on copper wires, and left on its surface, many inches from the condenser, in a state of chrystalization. This illustrates the wonders of nature, and accounts for the finding of salt on high mountains up to the line of perpetual congelation; and also accounts for the production of marine shales on mountain heights —for the deluge does not account for that, the flood not having been salt, but fresh water descending from the clouds.

The wear of the Niagara is the question that is at issue; and some say that it would require ten thousand years for the Falls to recede from toward Ontario to their present location. When we look at the great cliffs of the Kentucky river, which has its bed very deep in the bowels of the earth, and then at the channel and bed of the Au Sable, between Keeseville and Lake Champlain, where the river has cut a bed to the depth of one hundred or more feet in the sand-stone, we may have some better idea of the bed of the Niagara.

There were fearful earthquakes in Canada about the years 1662 and 1663, which continued for nearly a whole year. Mountains were sunk. These earthquakes were centred in the northerly and easterly part of the provinces. During my last visit to the Falls, I examined there—in connection with a high ridge between Lake Ontario and the chain of small lakes west—a land which I called the "Land of Flowers." It had the appearance of a primitive garden, and presented a new set of flowers every month during the season of vegetation. On my arrival at Table Rock, a gang of labourers were engaged in cutting through it, to draw off water from the river above the Horse Shoe, for the locomotives at the Suspension Bridge; and seeing me examining these excavations and the *debris* they had thrown out, they stopped work and kindly aided me in my researches, in which they seemed to take a deep interest. Here I obtained large pieces of *selenite*, *dog-tooth spar*, and *scintillating calcium*—each and all showing that Table Rock, which forms one of the abutments of the Horse Shoe, is a frail and shattered stratum, and is subject to disruption by intense frosts and other extraordinary conditions of the atmosphere.

The salt water, which is contained in the red and green shale which underlies Table Rock, the Horse Shoe, Goat Island, and the American Fall, is too dense in its present state to deposit *selenite;* but mixed with fresh water in such quantity as to reduce it to one hundred degrees by the *salemeter*, it will deposit *selenite* so rapidly, and with such force, that, if confined underground, it would gradually lift its surface or break it.

An immense volume of gas arises from the chasm into which the Niagara plunges from the lofty precipices which form the Horse Shoe on the American Fall, and might, with proper apparatus, be ignited—and, when on fire, would greatly exceed in beauty the flames of the gas ascending from the deep ravines of the *salines* of Kanhawha, which give a column of flame of seventy feet in height. I have specimens of all these saline waters in my cabinet, with those of the Sea of Sodom; and the rock specimens of all the strata of Niagara, including those of Table Rock and the green shale foundation, with specimens of every foot of strata passed in the sinking of the salt well at Lockpit (401 feet), and Montezuma (600 feet). With these, and abundant other specimens from the same district of country, I have materials with which to form the opinion I here express, that the Falls of Niagara do not date back to any period beyond the universal deluge.

Brooklyn Heights, Sept. 3rd, 1855. E. Meriam.

Papers on Practical Education.

PHYSICAL EXERCISES IN EDUCATION.

Few persons can help noticing the physical deterioration of the present race of mankind. On viewing the cumbrous armour and heavy weapons of the knights of old, hung up in some ancestral mansion, or reading of the great exploits of our forefathers, we are forcibly struck with the contrast of the vigour of the present generation. Where can men be found now, who could don the iron case of some old Baron, and go through the manœuvres of a "military day?" Although the world has advanced in civilization and knowledge, man's bodily powers have diminished in a manner which seems to say, that physical degeneracy is one of the conditions of mental development and enlightened progress.

The principal cause of the defect in the bodily condition of the people, is to be attributed to the manner in which they are nurtured. No means are employed to train children to feats of agility and strength.

In the schools of the higher classes, the scholars enjoy the benefits and pleasures of physical exercises, but our National Schools have yet to look forward for that boon.

The strength and powers of endurance of the people some centuries back, must be attributed, in a great measure, to their early training. Their early years were devoted to athletic sports, and feats of arms, so as to be foremost in the chase, and victorious in the tournament.

The result of such training is seen, in the records of their prowess. If physical training developed such vigour in those days, why is not a similar practice adopted now, to secure such desirable results! Surely, the different callings of labour require as much agility and strength, as the art of couching the lance, and the management of the war-horse.

Every school ought to have some sort of gymnasium attached to it, where the children's muscles, &c., may be gradually developed, and their several members improved. When a child arrives at the age of four or five, it is sent to school, where it is confined, for the chief part of the day, in an atmosphere which tends to check the bodily growth. This continues for several years, during which the mental faculties are continually employed. If the body be not duly exercised along with the mind—the latter, receiving more than its natural share of nourishment, causes a loss of vigour in the former. In the commercial world supply depends upon demand, so with the different members and parts of the human body. The supply of nourishment to any particular part of man's frame, depends upon the demand there —which demand is regulated in proportion, as that part is called into action. Therefore if any member remains dormant for want of suitable exercise, its undevelopement causes it to lose its natural strength.

Children after confinement in school, throughout the day, require something to call into action every muscle of the body. Their health depends upon it. The majority, if not all of our schools, however, are only provided with a small play ground, where the amusements are confined to shooting marbles, &c. Such a provision alone will not satisfy children's natural wants, and consequently, they grow up, in numberless cases, puny and weak, to find perhaps, a premature grave. No doubt, many persons think, that working men's children have sufficient call for bodily development at home. In some measure this is true, as regards rural districts, but not towns. In the former places, the poor man's child has plenty to do from sunrise to sunset. But do the children become vigorous and well developed men? Let any one take a survey of our rural population, and then make answer. The majority of them seem as unwieldy as polar bears; some carrying their heads a foot in advance of their bodies; others with mis-shapen legs—and nearly all possessing the most awkward gait. The towns are far worse off than country districts, for the means of athletic exercises. Crowded thoroughfares, and dark alleys form their gymnasium, and the youths' wan looks shew clearly the benefits derived.

So many young men have been returned, as unfit for military service in France, on account of some physical deformity, that the attention of the Government has been drawn to it, and means have been taken to remedy the evil. In this country, the same glaring fact has hitherto remained officially unnoticed, though it is sufficiently notorious. While the cry is now for education, let its promoters, as well as the teachers themselves, remember that it is as much their duty to endeavor to develope the physical powers of children, as the mental ones; so that in mind and body they may be fitted to meet the storm of life. To do this, the proper means must be connected with every school.

Mr. Mann, speaking of the pupils of the Royal Orphan House at Potsdam, says—"As the boys are destined for the army, it is thought important to give them agility and vigour. *It is not yet discovered that activity and energy are necessary in any occupation, save that of killing our fellow men.* The boys practise gymnastic exercises, such as climbing poles, ascending ropes, flinging their bodies round and round over a bar, while they hang on only by the bend of the legs

at the knee joints, vaulting upon the wooden horse, &c., &c., until their physical feats reach a point of perfection which I have never seen surpassed, except by professional circus riders, or rope dancers."

Dr. Bache, speaking of the same, says—"I have never seen a body of young men all so well physically developed, a result produced by constant attention to their education on this point."—*Papers for the Schoolmaster.*

EXTRACTS FROM THE MINUTES OF THE COMMITTEE OF COUNCIL ON EDUCATION—1854-5.

Complaints of Little Progress.—"What is gained on the one hand, by the improvement of the schools, is lost on the other, by the earlier age at which the children are taken away from them; and your Lordships' efforts for the education of the people are practically defeated; there being probably as many people as ever in this country, in proportion to the whole population, who are growing up unable to read and write. Every other impediment appears in process of removal but *this*. We seem to be in the way of getting schools, which, if they were duly appreciated by the poor, would, perhaps, be adequately maintained; and we are getting excellent teachers, but in *this* respect no progress is being made. The children of the poor leave school as soon as, indeed sooner than they ever did; and if in the returns from the schools receiving grants, this does not appear, it is because, from the improved character of those schools, the children of tradesmen and others well to do in the world are beginning to frequent them more than they did; and these persons, of course, keep their children at school longer than the others.

What, under these circumstances, can be done for the education of a poor child, may be judged of by any one who will consider how little has commonly been done for the education of one of his own children, before ten years of age. Let him consider what chance there would be of his own son turning to account any knowledge which he might by that time have acquired, or retaining any impressions for good which he might then have received, if he were left, for the four or five next years of his life, to spend day after day in the streets, or alone in the fields bird-keeping, or in a coalpit, with no other occupation than to open and shut a door, or in a factory, or a workshop with dissolute companions. Nothing can be expected of an education thus robbed of half its allotted period—of seed rooted up when it has hardly begun to shoot."—*Report of the Rev. H. Moseley.*

The Decreasing Age of School Children.—"The greatest of all school evils seems to be again on the increase. I speak of the almost infantine age of the children. The main and most striking facts are these;—There is an increase of above eleven per cent. in the very young children, *i. e.*, those under ten years of age. There is a decrease of nine per cent. in those of and above the age of twelve years. Little more than one tenth of all the school children under my inspection in Yorkshire are twelve years of age, and not half of them have been for one year in the same school. I fear that we are getting so accustomed to this standard of school age, as almost to regard it as the normal state, and to be passive under it, if not almost satisfied with it. Yet what is it in reality? Is it not a pretty fair assurance that all the long and imposing array of certified masters and mistresses, assistant teachers under your Lordships' Minutes, pupil-teachers of both sexes and different grades, numbering now above 6000—all the instructive books—all the excellent maps—all the ingenious apparatus—if not absolutely wasted—are indeed far too costly and too cumbrous for the service in which they are engaged, and about as proportionate to its requirements as a park of artillery for the dispersion of a flock of sparrows?—*Report by the Rev. F. Watkins.*

The New as compared with the Old Race of Teachers.—"As instructors, there can be no doubt they have great advantage over that race of teachers which is now passing away. But as trainers—as formers of the heart as well as of the mind of the working 'classes—as engravers of that character which should be stamped upon them—how do the certificated teachers stand? They for the most part, have one obvious and great disadvantage. They are very young when they enter upon their duties, and they have to deal with very young children. But the younger the children to be trained, the older, within certain limits, should the trainer be. He has more need of experience, of self-knowledge, of discernment in child-nature, and sympathy with child-life. He has before him a more delicate and continuous work, than he who acts upon the juvenile boy or girl. From some observation, I am inclined to think that many of the certificated teachers of the present day, men perhaps, more than women—several of those especially of higher attainments, are not good trainers or managers of their schools. They either trust to a sharp but unintelligible discipline, and enforce a rule where they ought to uphold a principle, or they are altogether unobservant of little things, as if they were trifles instead of steps to great things; they often spend the school time in lecturing rather than teaching, and in displaying their own treasures rathea than in increasing the little store of the children's knowledge."—*Report by the Rev. F. Watkins.*

'WHAT SPECIFIC MEANS CAN A TEACHER USE IN THE MORAL CULTURE OF HIS OR HER PUPILS?"

This is a topic involving the most important principles connected with the education of children, though they are often sadly overlooked. We usually strive first to improve their minds by familiarizing them with the various branches of science; secondly, to teach them the structure of their bodies, and give them laws for preserving life and health; but allow the imperishable in their natures to remain totally uncared for, or at best to receive but very slight cultivation. To come then, directly to the point, let us ponder upon ways and means of reaching the *hearts* of our scholars. They are diverse as the intellects of men. We have marked out the following: to keep ever before a school these four principles, *Truth*, *Obedience*, *Kindness*, and *Politeness*.

We are sufficiently familiar with little children, to know that they may be impressed with the beauty of these things. They will love that which is pure and good. It is not necessary to deliver, at stated periods, set homilies upon these subjects, but keep them at all times before the physical and mental eye. Let them be as familiar to their infantile ears as *Mother* and *Home*—the two dearest names on earth to a child. Keep them on the walls of the schoolroom. Give to them, as an exercise upon their slates, these four magic words, linked with precepts from the Great Teacher,, such as,: "Lie not." "Hate the evil and love the good." "Obey them which have the rule over you." "Be kindly affectioned one to another." "Do unto others as ye would have them do to you.!' This precious Golden Rule is a wonderful talisman. Evil passions have no existence where this holds sway.

As has been most truthfully said, the Teacher must, in the intercourse with his or her pupils, exhibit in person the loveliness of these graces; must be ever truthful, ever kind and polite. Let the children of want, who gather with the affluent to seek instruction, feel the pressure of a soft hand, and know the genial influence of kind words. It will win them to a life of virtue; while bitter scorn, or cold distrust, will banish them to infamy.

Bring before the children, in words which they can easily comprehend, narratives embodying these principles, that they may not only behold the beauty of theory, but the far richer beauty of practice. Often, as circumstances require, suffer these things to receive more marked attention. Allow me to give one illustration, at this point. Not long since I was present in a school, when one little girl struck another. The Teacher kindly called the offender to her side—told the pupils of the transaction, and inquired, "What has been violated?" All replied as with one voice, "Kindness," and then joined in repeating, "Do unto others as ye would that they should do unto you." The hazel eyes filled with tears—the golden head dropped—and we knew the *heart* was touched.

We should not fail to instruct those under our care, that there is a God in Heaven, who takes note of all they do, and that He descended once, and left a legacy to little children, and that angels there are, who watch over them, and grieve if they do wrong. We may perform all this and more, without infringing upon our other duties.

There is in my mind a figure which I will elaborate. Moral Culture is a tree. Its basis is the Bible, whose instructions are sap, vivifying the whole. Truth, Obedience, and Kindness are great branches. There are many little boughs of Benevolence, Cheerfulness, and the like. With proper care, there will be yielded leaves of consolation—blossoms of hope and joy—and the fruit of good deeds. We are gardeners. It is well for us to implant in each heart, a tree whose branches, blossoms and fruit, shall rejoice that heart here, and transplanted, flourish among others of luxuriant growth, in the gardens of Heaven.—*Ohio Journal of Education.*

HOME EDUCATION—VALUABLE HINTS.

The season will soon arrive when the long evenings will furnish a most favorable opportunity for mental improvement at home. Will not parents take special pains to instruct both their sons and daughters in this important work? We ask their attention to the following, from a true friend of youth:

BOYS OUT AFTER NIGHT.—Among the habits which I have observed as tending most surely to ruin, I know of none more prominent than that of parents permitting their sons *to be in the streets after nightfall.*

It is ruinous to their morals in all instances. They acquire, under the cover of night, an unhealthful state of mind, bad, vulgar, immoral, and profane language, obscene practices, criminal sentiments, a lawless and riotous bearing. Indeed it is in the street, after nightfall, that the boys principally acquire the education of the bad, and capacity for becoming rowdy, dissolute, criminal men. Parents should, in this particular, have a rigid and inflexible rule, that will not permit a son, under any circumstances whatever, to go in the streets after nightfall, with a view of engaging in out of door sports, or meet other boys for social chance occupation. A right rule of this kind, invariably adhered to, will soon deaden the desire for such dangerous practices.

Boys should be taught to have pleasure around the *family centre-table*, in conversation, and in quiet amusements. Boys are seen in

the streets after nightfall, behaving in a manner entirely destructive of all good morals. Fathers and mothers, keep your children home at night, and see that you take pains to make your homes pleasant, attractive, and profitable to them; and above all, with a view to their security from future destruction, let them not become, while forming their characters for life, so accustomed to disregard the moral sense of shame, as openly to violate the *Sabbath Day* in street pastimes, during its day or evening hours.

The Importance of Reading.—It is of the greatest importance that young persons should seek the companionship of books; should rest at times from the bustling affairs of business, and hold sweet converse with those great minds which have flourished in in all ages, and transmitted their researches for the benefit of posterity.

Books are never-failing sources of knowledge. We gaze upon nature, and turn to our books as our instructors; upon the starry heavens, and see there the streaming comet, the flashing meteor, the lurid lightning, and hear the deep-toned thunder pealing out its wildest notes—and then turn to the pages of science to learn why they are thus, and what great end they serve. And if we dive beneath the surface of the earth, a new field for contemplation is presented to the view—and this too is treated of on the printed page; for the geologist has done his part, that no avenue may be closed against the young aspirant for knowledge.

To seek for instruction is the imporative duty of the young, and there can be no better way to employ the leisure moments. Not in sauntering idly about, or frequenting the halls of pleasure and folly, but in poring over the pages of the poet, historian and philosopher, and gleaning gems of thought to enrich and beautify the mind.

There can be no higher eulogy upon a young man, than that his evenings were passed at home; where, gathered around the cheerful fireside, books, conversation, and the society of loved ones, render it an altar, a paradise, and a sure defence against the snares of vice and dissipation. We predict for such an one, honor, distinction, and a life of usefulness. And what can be more lovely, or fascinating, than a highly cultivated mind in a young woman. If but half the time which is expended in gaining a few trivial accomplishments was devoted to the right search for knowledge, there would not be such a meagre number of learned and talented women. Besides, the high estimation in which those few are held, is a sufficient stimulus, one would suppose, to urge others to do likewise.

Be a reader, then, a careful reader, if you would be powerful, if you would become wise and honoured, if you would be worthy the name and station of men and women.—*Rural New Yorker.*

Obedience, Diligence and Truth.—It is said that when the mother of Washington was asked how she had formed the character of her son, she replied that she had early endeavoured to teach him three things: obedience, diligence and truth. No better advice can be given by any parent.

Teach your children to obey. Let it be the first lesson. You can hardly begin too soon. It requires constant care to keep up the habit of obedience, and especially to do do it in such a way as not to break down the strength of the child's character.

Teach your child to be diligent. The habit of being always employed is a great safeguard through life, as well as essential to the culture of almost every virtue. Nothing can be more foolish than an idea which parents have, that it is not respectable to set their children to work. Play is a good thing, innocent recreation is an employment, and a child may learn to be diligent in that as in other things; but let them learn to be useful. As to truth, it is the one essential thing. Let everything else be sacrificed rather than that. Without it, what dependence can you place in your child? And be sure to do nothing yourself to give the lie to your own precepts.

Learning is not wisdom: we may master all the lore of antiquity, be conversant with all the writings, the sayings and the actions of the mighty dead—we may fathom science, read the Heavens, understand their laws and their revolutions, dive into the mysteries of matter, and explain the phenomena of earth and air; yet if we are not able to weigh our own actions and requirements with the actions of others in the balance of even-handed, impartial justice, and repine not at the verdict; if the clear, pure light of charity and forbearance has not cleared the mist of prejudice from our understanding, if we have not yet obtained the perfect knowledge and perfect government of ourselves, and strictly and faithfully maintained the secret spring of our minds, the fountain of our opinions and motives of our action, if we have not yet learned that "love is the fulfilling of the law"—*we are not wise*—we are as yet only on the threshold of knowledge.

EDUCATE THOROUGHLY.

The following opinions of modern educationists on this subject, collected by Hon. Mr. Barney, of Ohio, in his annual report, should be pondered by every teacher and parent.

It is essential to the highest success in teaching, especially in the elementary schools, that whatever is taught should be impressed again and again upon the mind of the pupil, until it shall be thoroughly wrought into his understanding as well as his memory. For whatever is worthy of being taught at all, is worthy of being taught accurately and thoroughly; and whatever is worthy of being learned at all, is worthy of being learned perfectly and remembered permanently, otherwise it should not be found among the appointed studies of the school.

"The habit of forgetting some things when attention is turned to others, especially in the earlier stages of education, is so great an evil in itself, and so discouraging to the learner, that it is far preferable for him to know perfectly, and retain easily and securely a part, than to have so many studies, that each, in turn, passes through the mind as clouds sweep through the sky." The want of attention to this important principle, renders the knowledge acquired in school exceedingly insecure, causing many things to fade from the memory in order to make room for others. Let the pupil, therefore, at the very commencement of his education, understand that he is to be benefitted, mainly, by what he learns and remembers, and not by what he learns and immediately, forgets, and never allow him to think that he has learned a lesson perfectly till he can explain it clearly and intelligently to others, and readily recall it at any future time.

Another principle, equally important with the foregoing, is "to make sure of what has been once learned, either by constantly reviewing it, or by frequently using it in the subsequent part of the course, or both. It is also essential that every review should be conducted in some new way, so that the same principle shall reappear under ever varying forms. The novelty of its new phases will keep up a fresh interest in the mind."

It is not essential to good education and proper mental discipline, that the field of study should be very large, but it is indispensable that every inch of it should be thoroughly cultivated; for the reason that a few subjects, fundamental in their character, which are well understood and fully digested, are of far greater value than a large number hastily and superficially studied. Not only is the effect upon the mind better, but the value of the habit, as an aid to future acquisition, is vastly superior. If the first acquisition of the scholar be of a faulty character, all his subsequent acquisitions will, in all probability, be equally so.

In schools where education is estimated by the number of subjects studied, rather than by the amount of mental discipline secured, and the accuracy and security of the knowledge obtained, "the effort of the scholars seems to be, to store the memory with an immense mass of words and sentences, which are to them little better than the words of a dead language, or with a great number of facts without understanding their nature, relations or uses. The minds of such scholars are like furniture rooms, crammed with articles without utility or order. The acquisitions made are not deeply and securely fixed in the mind. The objects presented to view leave no distinct impression. They are not compared, classified and arranged into a system by the intellect of the pupil, and consequently the memory holds them by a slight tenure. Knowledge thus acquired is too superficial to deserve the name, and rather injures than improves the mind. It tends to weaken the understanding, to destroy its soundness and integrity, and to render it incapable of those decisive and sure acts which are necessary to command reliance. What is chiefly to be aimed at in training this faculty is to give it power and precision, so that it may be both effective and safe in its operations. Such a result can be produced only by patient, exact, and thorough training."

"Systematic and efficient mental training is a primary object of education, to which the acquisition of knowledge is but secondary. The latter is, in the earlier stages of study, chiefly important as a means of mental discipline, having, at the same time, a true but subordinate value."

"It is much better for a student to be able to master a few studies well, than to be hurried through a large number in that superficial manner so popular at the present time; for the object of education, in its first and earlier processes, is not so much to impart a given amount of learning, as it is to form correct habits of study, and secure the power of future acquisition. This object should never be overlooked, for it lies at the foundation of all success with the scholar and the man of business."

"The success of the student depends not so much upon the extent of his acquisitions as upon the manner in which they have been made. A few subjects properly studied afford more real mental discipline than a score hastily and superficially pursued. In the former case, the acquisitions are wrought more deeply into the mind, and converted, as it were, into its own substance."

"Though elementary knowledge be limited, if it be well chosen, and used chiefly as a means of intellectual training, it will constitute a solid and secure basis, on which the acquisitions of a whole life may safely rest."

"If every exercise in the school were such in its disciplinary charac-

ter that it might serve as a pattern to be copied in all the remaining studies and business of life, this one feature in a system of education would be so valuable that, in comparison with it, all the superficial and ostentatious attainments made without method or discipline, would be of little account."

"Habits of order, of accuracy and thoroughness, lie at the foundation of all success in business no less than in scholarship."

"This building up of the solid framework of the mind, giving it capacity and aptitude for vigorous and systematic action, is a principal object of education. A contrary course impairs the strength of the intellect, weakens the whole foundation of character, begets disgust with intellectual effort, and produces just such a character, as it is the business of education to guard against."

"Not only should the number of studies be di inished, but the extent to which each is usually pursued in the primary schools, should be abridged. It is of but little use to proceed far in studies in that superficial manner so common in many schools. If the plan be well laid out, and the studies properly arranged, the more labor bestowed upon the elementary part of each, the better will it be for the future progress of the learner."

"Subjects which require a certain amount of preparatory knowledge, and maturity of judgment in order to be understood, fail of their object when prematurely introduced, and lose, perhaps forever, the power of creating interest in the mind. It matters not how important and useful in themselves such studies may be; they can be more advantageously pursued at a future time."

"*Thoroughness*, therefore, *thoroughness*, for the sake of the knowledge, and still more for the sake of the habit, should, at all events, be enforced; and a pupil should never be permitted to leave any subject, until he can reach his arms quite around it, and clench his hands on the opposite side."

"It is of far more consequence to give the mind a degree of power, which it shall be able to apply to any future study when needed, than it is to store it with any conceivable amount of learning."

THE BEST MEANS OF OBTAINING ORDER IN A SCHOOL.

To obtain order and discipline in a school is of the utmost importance; there can be very little, if anything, taught in the midst of disorder. The children themselves are not happy in it; the teacher is made unhappy and fretful, and totally unfit for his work, and at the close of the day he cannot look back and feel that he has faithfully performed his duty. On the contrary, in a well-disciplined and organised school it is surprising what an amount of work may be done, because it is performed in a regular manner, and every portion has its allotted time. The children get more knowledge, and learn besides the habits of regularity and order, and the teacher is cheerful and satisfied with himself.

I think perhaps the following hints may be useful to any of my fellow-labourers who find a difficulty in obtaining that which is most essential and necessary, viz. order.

In the first place give your commands in a quiet and firm tone. I have invariably found that a noisy teacher has a noisy school. Let your voice be distinctly heard throughout the room; and when once you have issued a command, see that it is strictly obeyed. It is therefore of great importance that your commands should be considered before they are spoken.

Firmness in the tone of voice is necessary, as indecision is very soon noticed by children, and will be treated accordingly. Be sure that you always perform your promises, and never let a child have reason to think his teacher has broken his word; whether you offer a reward to the obedient or a punishment to the disobedient, in either case keep strictly to what you have said.

Instant obedience should be required, no hesitation allowed; an occasionally drilling-exercise will greatly facilitate this. I do not think that time is wasted which is spent in training children to habits of regularity.

Be sure that one command is obeyed before another is given. A teacher must govern his own temper, as hastiness and irritability will make him fail in the very object he is trying to obtain. These characteristics should always be found in a teacher, viz. patience, firmness, and gentleness.

In giving a lesson, I find that a kind and pleasing tone of voice will help to fix attention, and make a difficult subject interesting and agreeable.

Order must be preserved in little things. There are few things too trivial to be attended to. Let every child know his place and his work, and keep to it. In making children orderly, a teacher studies his own comfort as well as the good of his scholars.

"Let every thing be done decently and in order."—*National Society's Monthly Paper.*

ARNOLD'S SYSTEM THE SOCRATIC MODE.

DR. ARNOLD'S whole system was founded on the principle of awakening the intellect of every individual boy. Hence it was his practice to teach by questioning. As a general rule, he never gave information except as a kind of reward for an answer, and often withheld it altogether, or checked himself in the very act of uttering it, from a sense that those whom he was addressing had not sufficient interest or sympathy to entitle them to receive it. His explanations were as short as possible,—enough to dispose of the difficulty, and no more; and his questions were of a kind to call the attention of the boys to the real point of every subject, to disclose to them the exact boundaries of what they knew or did not know, and to cultivate a habit not only of collecting facts, but of expressing themselves with facility, and of understanding the principles on which their facts rested. "You come here," he said, "not to read, but to learn how to read;" and thus the greater part of his instructions were interwoven with the process of their own minds; there was a continual reference to their thoughts, an acknowledgment that, so far as their information and power of reasoning could take them, they ought to have an opinion of their own. He was evidently working not for, but with the form, as if they were equally interested with himself in making out the meaning of the passage before them. His object was to set them right, not by correcting them at once, but either by gradually helping them on to a true answer, or by making the answers of the more advanced part of the form serve as a medium, through which his instruction might be communicated to the less advanced. Such a system he thought alike valuable to both classes of boys. To those who by natural quickness or greater experience of his teaching were more able to follow his instructions, it confirmed the sense of the responsible position which they held in the school, intellectually as well as morally. To a boy less ready or less accustomed to it, it gave precisely what he conceived that such a character required. "He wants this," to use his own words, "and he wants it daily,—not only to interest and excite him, but to dispel what is very apt to grow around a lonely reader not constantly questioned—a haze of indistinctness as to the consciousness of his own knowledge or ignorance; he takes a vague impression for a definite one, an imperfeect notion for one which is full and complete, and in this way he is constantly deceiving himself."

Hence also, he not only laid great stress on original compositions, but endeavored so to choose the subjects of exercises as to oblige them to read and lead them to think for themselves. He dealt at once a death blow to themes (as he expressed it) on "Virtus est bona res," and gave instead historical and geographical descriptions, imaginary speeches or letters, etymological accounts of words, or criticisms of books, or put religious and moral subjects in such a form as awakened a new and real interest in them: as for example, not simply, "carpe diem," or, "procrastination is the thief of time;" but "carpere diem jubent Epicurei, jubet hoc idem Christus." "Ha! very good!" was his well known exclamation of pleasure when he met with some original thought; "is that entirely your own, or do you remember anything in your reading that suggested it to you?" Style, knowledge, correctness or incorrectness of statement or expression, he always disregarded in comparison with indication or promise of real thought. "I call that the best theme," he said, "which shews that the boy has thought and read for himself; that the next best, which shews that he has read several books, and digested what he has read; and that the worst, which shews that he has followed but one book, and followed it without reflection."—*Stanley's Life of Arnold.*

DR. ARNOLD A CHRISTIAN MAN.

All have noticed with pleasure the growth of the feeling, which is now becoming so prevalent, with regard to the late Dr. Thomas Arnold. While he was the Head-Master at Rugby, he was one of the marked characters of England. His strong political animosities, his continued opposition to the Oxford theology, his vehement animadversions against the evils of the day, and the zeal with which he labored to effect the changes which his own judgment approved of, made him not only a marked man, but also roused a spirit of bitter hostility to him, which, as Arnold remarked, has perhaps never been paralelled in the history of schools. In the school-room his influence was ever great; yet, as his biographer tells us, it was to a large extent bounded by the walls of Rugby. Four years he laboured to establish himself in the confidence and affection of the young men there; and when at the end of that time he felt that this object was attained, began his powerful sway over the succeeding classes. It was not till his death, however, that his influence began widely to be felt; the number of his pupils had then become very large: they were to be found, not only at the Universities, but scattered, as Arnold beautifully foretold that they would be, through England and her colonies; and then when his pupil Stanley gave the seal to his life by sending forth his modest and elegant biography, in which his teacher's character speaks on every page,

Arnold began to be recognized, not only as the great instructor of this age, but also as the thoroughly devoted Christian man.

We do not wish to fill the pages of this magazine with the details of Arnold's life; they may be found in their own place. In fact, his is not a life but a character. He accomplished no sounding exploit: he never met a hair-breadth escape; he saved no soul from drowning or shipwreck; he explored no distant land; he made no brilliant discovery to dazzle the eyes of mankind; he was born, he lived and died; he left nothing but works partially executed, and a fragrant character which has strengthened and inspired many already, and which will prove a continued blessing which shall outlive this age.

Arnold was an eminent teacher, but we are not to suppose that he had not his equal. We have no reason to suppose that in the communication of knowledge, he was not excelled in some departments. Rugby then, as now, was not mentioned first among the public schools of England; young men went thence to the Universities well prepared, but not better than those from Eton and Winchester. For success in stimulating young minds in intellectual pursuits, Dr. Arnold was deseservedly celebrated; his biographer tells us that the room where the lessons of the Sixth Form, were heard, was probably the "scene of the greatest intellectual ardor in the kingdom." But we must not be led into a false estimate of the relative position which Arnold ought to hold as a *teacher*. His glory lies in this one word: he had the distinguished honor of being the first who introduced the religious element into the great public schools. That he was the pioneer in this great work, let us never forget; and while we concede to others skill in the communication of knowledge equal to his, let us reserve for Arnold the proud honor of having christianized education.

It was Arnold's crowning excellence as a teacher that he was so thoroughly religious a man. His whole life was the consecration of himself to God, and to his duty. In these days, when there is so much one-sided cant about humanity, and devotion to its interests, it is refreshing to turn to the pages of Stanley's well-told biography, and learn what such devotion is when pure and true. If ever Christian man lived, that man was Thomas Arnold. If there has ever been manifested persistency in the cause of Christ,—resolute opposition to evil, and sympathy with good,—it was shown in his life. In many cases, it is true, he did things which were not expedient; sometimes, too, he opposed evils which were the offspring of his own fancy; but in all that he wrote, said, and did, there lives such a vigorous Christian spirit, that we cannot sufficiently admire and imitate it.

And his religion was wholly without cant. Though on almost every page of his biography there occur expressions which, falling from the pen of a common man and an ordinary christian, would sicken and disgust, yet we always feel that they are the sincere expressions of one who is not only conscious of the whole meaning of his words, but religiously feels their force. And Arnold was no fanatic; his religion was not of that spasmodic nature which now almost expires, and anon shoots up in dazzling splendor. Arnold's devotion was constant and well sustained, and whether teaching in the quiet hamlet of Laleham or uttering his last words, amid the terrible pain of angina pectoris there ever breathes a strong and unwavering spirit of devotion. If one is ever impressed with the fact, that, aside from all the hollow mockery which religion often assumes, there is a reality which may be shown in the thoughts and actions of a man, he can strengthen that impression by studying this noble character. If one feels that the flame of piety is burning low in his own heart, if the words of Arnold as they are exhibited in his letters and in his recorded observations do not kindle it into greater vigor, there are but few means which will.

We must remember that we, as teachers, generally fail, if we do fail, not in the communication of knowledge, but in the sustaining of a well-balanced mind, and a perfectly consistent character. Here we can take Arnold as a model. He was, it is true, no saint. He was a man of strong passions, easily betrayed into extreme severities of language, lacking in toleration, fiercely independent, but yet so prayerful a man, so watchful of himself, so regardful of his trusts, and so impressed with the present hand of God, and so filled with a reverential spirit, that we reject one of the great means which have been placed in our power, if we do not study his life to attain light for our own feet.—*Massachusetts Teacher.*

A SCOTTISH SCHOOL FIFTY YEARS SINCE.

(*From Hugh Miller's Autobiography.*)

I quitted the dame's school at the end of the first twelve-month, after mastering that grand acquirement of my life,—the art of holding converse with books; and was transferred straightforth to the grammar school of the parish, at which there attended at the time about a hundred and twenty boys, with a class of about thirty individuals more, much looked down upon by the others, and not deemed greatly worth the counting, seeing that it consisted of only *lassies*. And here, too, the early individual devolopement seems nicely correspondent with an early national one. In his depreciatory estimate of contemporary woman, the boy is always a true savage. The old parish school of the place had been nobly situated in a snug corner, between the parish churchyard and a thick wood; and from the interesting centre which it formed, the boys, when tired of making dragon-horses of the erect head-stones, or of leaping along the flat laid memorials, from end to end of the graveyard, "without touching grass," could repair to the taller trees, and rise in the world by climbing among them. As, however, they used to encroach, on these latter occasions, upon the laird's pleasure grounds, the school had been removed ere my time to the sea-shore; where, though there were neither tombstones nor trees, there were some balancing advantages, of a kind which, perhaps, only boys of the old school could have adequately appreciated. As the school-windows fronted the opening of the Frith, not a vessel could enter the harbor that we did not see; and, improving through our opportunities, there was perhaps no educational institution in the kingdom in which all sorts of barks and carvels, from the fishing yawl to the frigate, could be more correctly drawn on the slate, or where any defect in bulk or rigging, in some faulty delineation, was surer of being more justly and unsparingly criticised. Further, the town, which drove a great trade in salted pork at the time, had a killing-place not thirty yards from the school-door, where from eighty to a hundred pigs used sometimes to die for the general good in a single day; and it was a great matter to hear, at occasional intervals, the roar of death outside rising high over the general murmur within; or to be told by some comrade, returned from his five minutes' leave of absence, that a hero of a pig had taken three blows of the hatchet ere it fell, and that even after its subjection to the sticking process, it had got hold of Jock Keddie's hand in its mouth, and almost smashed his thumb. We learned, too, to know, from our signal opportunities of observation, not only a good deal about pig anatomy,—especially about the detached edible parts of the animal, such as the spleen and the pancreas, and at least one other very palatable viscus besides,—but became knowing also about the *take* and the curing of herrings. All the herring-boats during the fishing season passed our windows on their homeward way to the harbor; and from their depth in the water, we became skilful enough to predicate the number of crans aboard of each with wonderful judgment and correctness. In days of good general fishings, too, when the curing yards proved too small to accomodate the quantities brought ashore, the fish used to be laid in glittering heaps opposite the school-house door; and an exciting scene, that combined the bustle of the workshop with the confusion of the crowded fair, would straightway spring up within twenty yards of the forms at which we sat, greatly to our enjoyment, and, of course, not a little to our instruction. We could see, simply by peering over book or slate, the curers going about rousing their fish with salt to counteract the effects of the dog-day sun; bevies of young women employed as gutters, and horridly incarnadined with blood and viscera, squatting around the heaps, knife in hand, and plying with busy fingers their well-paid labours, at the rate of a sixpence per hour; relays of heavily laden fish-wives bringing ever and anon fresh heaps of herrings in their creels; and outside of all, the coopers hammering as if for life and death,—now tightening hoops, and now slackening them, and anon calking with bullrush the leaky seams. It is not every grammar school in which such lessons are taught as those, in which all were initiated, and in which all became in some degree accomplished, in the grammar school of Cromarty!

The building in which we met was a low, long, straw-thatched cottage, open from gable to gable, with a mud floor below, and an unlathed roof above; and stretching along the naked rafters, which when the master chanced to be absent for a few minutes, gave noble exercise in climbing. There used frequently to lie a helm, or oar, or boat-hook, or even a foresail,—the spoil of some hapless peat-boat from the opposite side of the Frith. The Highland boatmen of Ross had carried on a trade in peats for ages with the Saxons of the town; and as every boat owed a long-derived perquisite of twenty peats to the grammar school, and as payment was at times foolishly refused, the party of boys commissioned by the master to exact it almost always succeeded, either by force or stratagem, in securing and bringing along with them, in behalf of the institution, some spar, or sail, or piece of rigging, which, until redeemed by special treaty, and the payment of the peats, was stowed up over the rafters. These peat-exhibitions, which were intensely popular in the school, gave noble exercise to the faculties. It was always a great matter to see, just as the school met, some observant boy appear, cap in hand, before the master, and intimate the fact of an arrival at the shore, by the simple words, "Peat-boat, Sir." The master would then proceed to name a party more or less numerous, according to the exigency; but it seemed to be matter of pretty correct calculation that, in the cases in which the peat claim was disputed, it required about twenty boys to bring home the twenty peats, or, lacking these, the compensatory sail or spar. There were certain ill-conditioned boatmen who almost always resisted, and who delighted to tell us—invariably, too, in very bad English, that our perquisite was properly the hangman's perquisite, made over to us because we were *like him;* not seeing—blockheads that they were!—that the very admission established in full the rectitude of our claim,

and gave to us, amid our dire perils and faithful contendings, the strengthening consciousness of a just quarrel. In dealing with these recusants, we used ordinarily to divide our forces into two bodies, the larger portion of the party filling their pockets with stones, and ranging themselves on some point of vantage, such as the pier head; and the smaller stealing down as near the boat as possible, and mixing themselves up with the purchasers of the peats. We then, after due warning given, opened fire upon the boatmen; and, when the pebbles were hopping about them like hailstones, the boys below commonly succeeded in securing, under cover of the fire, the desired boathook or oar. And such were the ordinary circumstances and details of this piece of Spartan education; of which a townsman has told me he was strongly reminded when boarding, on one occasion, under cover of a well-sustained discharge of musketry, the vessel of an enemy that had been stranded on the shores of Berbice.

JOURNAL OF EDUCATION, Upper Canada.

TORONTO: OCTOBER, 1855.

*** Parties in correspondence with the Educational Department will please quote the *number* and *date* of any previous letters to which they may have occasion to refer, as it is extremely difficult for the Department to keep trace of isolated cases, where so many letters are received (nearly 500 per month) on various subjects.

THE EDUCATIONAL FEATURES OF THE LATE PROVINCIAL AGRICULTURAL EXHIBITION.

We believe it quite to be within the scope of this *Journal* to trace out the Educational features of the recent Agricultural Exhibition at Cobourg. It is an highly gratifying circumstance to notice that the Representative of Her Majesty appreciates the exertions of the people of Upper Canada in placing their system of public instruction upon a broad and ample basis. In a reply to the address of the Agricultural Association, His Excellency expressed his belief that our "School and Municipal systems may serve as models for longer settled countries;" and in his reply to a toast given at a dinner in London, he is reported to have said,—"I look forward to a great and glorious future for Upper Canada. With its love for law and order, adherence to constitutional principles, its fertility of soil, its railways and lakes bringing down the produce of the country, and with a good government, it is your own fault if you are not a great country some day. But to yourselves you must trust; and I pray earnestly that this progress may continue while I am among you. It is upon your system of education, and your municipal institutions, and public works you have to rely." The same testimony is borne more at length by the President of the Association, David Christie, Esquire, in his Annual Address before that body. He said "The youth of Canada are enjoying the blessings of a Common School System, which is the glory of our land and the honor and pillar of the state."

The warm interest which was felt in the success of our Educational system by His Excellency's distinguished predecessor Lord Elgin, will long be remembered by the Canadian people. No man valued more highly, in a national point of view, than he did, the maintenance of an effective system of public instruction. He judged rightly in placing it in the van of all the social interests of the State, which it is the duty of the Legislature and Government to sustain and promote. We are happy to observe that the same patriotic policy has been pursued, to some extent, by Sir Edmund Head, and that public men of all parties unite in maintaining our public school system, and with pride refer to its successful operation.

From Mr. Christie's address, delivered before the Agricultural Association, we select the following extracts, in which the President refers in striking and forcible language to the importance of "Agricultural Education as the great instrument in promoting our prosperity as a people. He observed:

Men generally assent to the proposition that "Knowledge is Power," yet it is a fact that Agriculturists, as a body, do not act on this principle; I mean in so far as regards the *Science* of Agriculture. * *

It is a very common opinion that education unfits men for labor, and that the only man who will assiduously persevere in it is the ignorant and illiterate. * * * * * * *

Nothing can be more pernicious in practice than this false estimate of the effect of education. The mass of Canadian Farmers till their own lands, and the labor is chiefly performed by their own families. Should they train their families on the principle that labor and education are incompatible, how fearful would soon be the result as respects our social and industrial position? Fortunately, the youth of Canada are enjoying the blessing of a Common School system, which is the glory of our land, and the honor and pillar of the State. They cannot therefore, be illiterate. But they do not receive that kind of education which will fit them for the proper exercise of the profession of Agriculture. Here lies the whole cause of the difficulty.

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Where, then, is the remedy? The work must begin with yourselves. You have, by your apathy, sanctioned the degradation of your profession. You have permitted other men to form a low estimate of it, and to usurp that position which, in common with them, you should occupy. What secular pursuit is superior to yours, either in point of honour or usefulness? yet by many it is not so deemed. I have heard men, from whose education better things might have been expected, talk contemptuously of the men who wear homespun. Make the frieze coats respected. Don't think and say that labour and education are incompatible. Teach your young men that they ought to be associated. Give your sons not merely good common school instruction, but a liberal and *thoroughly scientific agricultural education.*

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If the next generation of farmers could be well educated in their profession, it is almost impossible to estimate the vast change which would take place in the world's progress. What is urged is,—education, in the true and proper sense of the term, namely, the thorough training of the mind, with a special reference to the practice of agriculture. It includes the theory and practice of the profession,—neither separately, but both combined. Theory alone cannot make a man a good farmer. * * * * * * *

Science must assist him, by telling him what sustenance each kind of crop requires—whether it be organic or inorganic; and, from a careful analysis of the soil, whether such substances be among its component parts, and in the necessary proportions. No amount of merely practical skill can, in all cases, indicate this; science alone can determine it. How often is the merely practical man bitterly disappointed, when, after preparing a field in his usual way, he finds that the crop falls far short of his expectations? Such failures cannot be accounted for by any incidental and obvious causes; there is the want of *something* to complete the amount and kind of food necessary for the crop—but he cannot tell what that want of *something* is. Here science must aid him, or he will be left to grope in the darkness and mist of uncertainty. We may learn much from the book of experience; but its teachings are vague and uncertain, unless we are somewhat acquainted with the laws which regulate the universe A physician, practising his profession in ignorance of general principles, and trusting to his experience, might avoid doing much mischief in ordinary cases; but in those of complexity and peril, he would be utterly helpless. The like case is that of the farmer who has no scientific knowledge. He may indeed wish to read correctly the laws of the practical world, but this he cannot do accurately without science. This is the difference between the empirical and the scientific physiologist. The empiric is contented with observing and recording the resulting fact; while the scientific physiologist must ascertain the manner in which physiological laws operate. The attention of the one is directed to results in the improvement of his art; and that of the other to the enlargement of his stock of knowledge. There is a strong tendency in those two methods to combine and unite in one grand result. That they do so combine is unquestionably true. All science is true; and the results of the operation of the great principles which it teaches must be exactly in accordance with it Now, the object of the science of agriculture is to construct a scheme of knowledge which shall not only explain results, but be a guide to the evolution of correct systematic practice. This identity of result is not merely important as respects the discoverers and im-

provers, but to man as man—elevating him morally and intellectually, and providing largely for his temporal wants. * * * *

Having thus stated that a liberal and scientific education ought to be the portion of every farmer who wishes to excel in his profession, the remaining point to be glanced at, is the instrumentality by which it is to be obtained. And I wish now more particularly to direct your attention to the means for educating the rising generation. A considerable part of the training of every young farmer in early life, indeed the greater part of it must be got at home. Every farmer can teach his son a great deal of the practice, and some, a part of the science of the profession of Agriculture. But however well qualified many are to give instructions and to avail themselves of their leisure hours to impart it, yet, unaided by public instruction, the mind cannot be fully developed in the science. However good private tuition is, yet it is an acknowledged fact, that apart from public instruction, it fails to produce a well developed mind and character. *The experience of men in all ages has been that the work of giving instruction can only be well done by those whose special business it is.* It is the only rational and effective plan, and we have an Institution of this kind. In University College, there is an Agricultural Professorship, and connected with it an Experimental Farm. As you are aware our worthy Secretary Mr. Buckland is Professor of Agriculture. He combines those qualities which are necessary for his position; he has not only scientific attainments of a high order, but he has been long a practical farmer. He teaches the History, Science and Practice of Agriculture. The Professors of Chemisty, Natural History, (including Botany and Entomology.) Geology and Mineralogy give special Lectures on those branches of Scientific Agriculture which belong to their respective departments. As an incentive to Students, the Senate of the University have erected *Five* Scholarships in Agriculture, of the value of £30 per annum each. Professor Buckland, in order as much as possible to suit the convenience of young farmers who cannot spare their whole time, has very considerately fixed the commencement of his course in November. It ends in March. Young men can thus be absent from home for instruction during that portion of the year when they can best spare the time. It is to be regretted that, comparatively few have availed themselves of the advantages thus offered. While the Agricultural Schools of Cirencester, Edinburgh and Templemoyle in Great Britain, of Grignon and Roville in France, of Hohenheim and Moeglin in Germany, of Hottbeck in Flanders, and Hofwyl in Switzerland have their crowds of eager students, our Canadian School of Agriculture is almost tenantless This ought not so to be. Unless we rouse to action, we shall fall far behind in the race of Agricultural improvement. In a country where Agricultural societies are so much appreciated and so liberally supported, why is it that we pay so little attention to the acquisition of that kind of knowledge which is their mainspring, and which more than anything else will contribute to the improvement and wealth of Canada. Let us do our duty in this matter; the interests of the country demand it.

It is a gratifying and important fact to be able to state, in connection with this address, that, since December, 1853, the Department of Public Instruction has put into circulation (in connection with the public school libraries) no less than 6,000 volumes of works relating to the science and practice of agriculture, and that these books are much sought for and read. During the Governor-General's visit to the agricultural exhibition at Cobourg, the following address was presented to him by the authorities of Victoria College:—

To His Excellency Sir Edmund Walker Head, Bart., Governor General of British North America, &c. &c. &c.

May it Please Your Excellency:

We, the President and Faculty of the University of Victoria College, desire to present to your Excellency, on this your first visit to the town of Cobourg our most hearty welcome. We welcome your Excellency not only as the constitutional Representative of our beloved Sovereign whose name this University bears, and to whose Crown and person we feel it an honour and a duty to express our allegiance and regard, but also, as the Officers of a public seminary of learning, we welcome your Excellency as a distinguished son of one of the most distinguished Universities in the world.

The institution with which we have the honor to be connected was established by the Conference of the Wesleyan Methodist Church, at a period when a general feeling in favour of education did not prevail in Upper Canada. Very formidable obstacles have stood in the way of its prosperity, but chiefly such as result from the want of those liberal pecuniary resources so necessary for the healthy working of a public Institution of learning. But notwithstanding this a very large number of the youth of this Province have obtained here those educational acquirements which have qualified many of them for occupying prominent positions in the ranks of the liberal and other professions in this country.

We beg to state to your Excellency that the education which is imparted here is not sectarian. This the charter of our University expressly forbids, while it fully concurs with the views of those by whom it was established, in enjoining that it shall be christian.

The institution comprises a Grammar School as well as an University. The course of instruction in both is liberal, and the increasing number of youth, amounting now to two hundred annually, who resort here from all parts of the Province for mental culture, affords gratifiying evidence that our efforts are generally appreciated.

An highly efficient Medical Department which is conducted in Toronto, was added to the University the last year. And while we are thus extending its operations and adapting its provisions to the wants of our rising country, we assure your Excellency that it is our steady aim to combine with the lessons of literature and science, those higher instructions which lead to the fear of God, and to all due allegiance to the beloved and rightful Sovereign of a people who shew, that they practically comprehend human rights and are determined, at whatever sacrifice, to uphold and extend human freedom.

Such being the character of the public Institution over which we are placed, we desire to express to your Excellency our confident hope, that in the administration of the affairs of this important Province all the friends of liberal education will find in your Excellency, a generous supporter of every institution whose object is to build up a free, an enlightened, and a Christian people.

We wish your Excellency and family, the choicest blessings of a gracious Providence, and pray that your Excellency may be so guided in the government of this portion of Her Majesty's Empire, that future generations may have cause to pronounce a blessing upon your Excellency's name.

REPLY:

Mr. President and Gentlemen of the University of Victoria College.

In a new country there is often great difficulty in organizing and maintaining those institutions whish are destined to afford a complete training in the higher branches of education, whether literary or scientific.

I receive, therefore, with peculiar satisfaction, an address from one of the institutions employed in this important work.

The description which you have given me of your own system, the zeal and the principles of the Wesleyan body, as well as the reputation which you have already earned at Victoria College, assure me that you are efficiently contributing towards the future happiness and prosperity of Canada.

I pray that Providence may bless your effort to inculcate sound religion and useful learning: and I thank you heartily for the reception now offorded me.

MENTAL IMPROVEMENT FOR FARMERS.

From the Working Farmer.

But few persons ever reflect on the means by which they may improve their general ability for increased thought, while all agree that the human mind is susceptible of such improvement and by no class of citizens is this subject more neglected than by farmers.

The farmer, beyond all others, should have clear powers of observation, so as readily to observe and apply nature's laws. His vocation is the root of all prosperity, and until the farmers of a nation are progressed to the highest power of observation, the country cannot rise to the highest rank.

Let us examine this subject as appled to an individual case, and the means may possibly be ascertained of arriving at the desideratum.

The usual argument in favor of a thorough and conventional education, although admitted, is not practicable. Farmers cannot be mere scholars; the vigor consequent upon their mode of life is not of a kind to render them capable of becoming mathematicians, nor of availing of that part of the usual progress having a mathematical basis; but still we argue that no class of men are so capable, when properly directed, of availing of processes by which the more useful class of facts may be attained.

Lord Brougham has justly remarked, "That mathematical truths "may be arrived at by thought alone; and he says "any man *may*," he does not say *will*, "by the process of thought alone, arrive at the "solution of any problem in mathematics," by the same process of thought as that by which he knows that two and two make four. But, says the learned gentleman, "no man can know by thought alone "that a stone let fall from his hand would descend to the grond." He knows this fact from *observation*, and not from *thought;* for if he had not seen the law of gravitation exercised in some way before, he could not by any thought of his own tell if the stone would fall, rise, or float at the level of his hand. He knows this fact by example, and not by thought. The means of such knowledge is not inherent in man.

Gravity is a law of God, and as such is only to be learned by observing its development in nature. We have cited this example only as a basis, and will now proceed to give a few other incidents, and then to shew the application to our present argument.

All will admit that some men profit by observation more than others, while but few know the means by which this power of observation may be increased. As examples of this absence of observation, how few farmers know that cows and sheep have no upper teeth; how few are aware that cold water will dissolve more salt or lime than hot water. Does one in one hundred know that a gallon of water will dissolve more plaster of Paris than it will of slaked lime, that has been long enough exposed to the atmosphere to become carbonate of lime? How many know that water is at its mean of size when at 40° of heat, that if cooled below that temperature it swells, until it becomes ice at 32°, and if heated above 40° it also swells, until it eventually becomes steam, thus occupying more than 1,700 times its original space? Still, all these are facts, and to minds generally observant, they are well known to be true.

The science of farming embraces all Nature's laws, and the habit of observation will soon render the farmer ready to recognize these laws in all their useful applications. Let him know enough of chemistry, which he may do by one week's reading, to comprehend the various changes that the integrants of the soil undergo to enable them to enter the plant, and he will soon observe the fact that these chemical changes must include the ability of being dissolved in water before the plant can receive them. He will also soon find that water, in its pure state, will not dissolve the necessary quantity of all these materials, unless it contains carbonic acid, and this will necessarily lead to his understanding whence this gas is obtained, and why it pervades the atmosphere. When he observes that water from a spring, applied to plants in time of drought will not produce the same amount of improvement as is received from a similar amount of water falling through the atmosphere in the form of rain, he will soon understand that the rain-water comes charged with some ingredient from the atmosphere which the spring water does not contain, and the slightest examination informs him that this is ammonia, and that it is received in the atmosphere from the decay of former crops, animal exudations, &c. The slightest exercise of the mind in the observance and application of the commonest truths of Nature's laws will capacitate it for another step in progression; for the brain, like the arm of the black-smith or the leg of the dancing-master, must increase in energy at least, if not in size, by healthful use, and this use is a free observance of God's laws as displayed in the progression of nature.

All have observed that the inhabitants of the country have this power of observation to a greater extent than those whose tastes lead them to become inhabitants of large cities, and to engage in mercantile pursuits. Indeed, this fact has given rise to many anecdotes, such as the boy, who, when asked which was the direction of up stream, ascertained the fact, and answered the question by throwing a stone at a frog, then remarking a frog always jumps up stream when disturbed.

The Captain who visited Sir Joseph Banks is another example of this power of observation. Sir Joseph said: "You appear, Sir, an observant man; do you know if the crocodile really cries to entice travellers, as has been stated?" "No," said the Captain; "he cannot cry; he has no tongue." "No tongue!" said Sir Joseph. "No, Sir; he has no more tongue than an elephant." "Has an elephant no tongue?" "No, he has no use for a tongue; he has a trunk." "Pray, Sir," said Sir Joseph, "how did you arrive at these facts?" "Well," said he, "I saw a stuffed crocodile in a doctor's shop, and I saw an elephant in a menagerie. Still thousands of others might have seen the same crocodile and elephant without ascertaining the same facts." These anecdotes may not seem pertinent to our argument, but they are so. Let any farmer devote the evenings of a single winter to the reading of Geology, Entomology, Chemistry, Natural Philosophy, and Natural History, and apply his acquired knowledge as an amusement, while pursuing his vocation during the following summer, and he will find himself able to observe and comprehend thousands of incidents connected with natural law, which would before have passed by unobserved. He will then see and understand that the soil is but a debris of the rocks, that in its original formation this occurred from the combined influence of sun and air, and changes of temperature by freezing and thawing, in rendering these rocks a soil. He will see how the convulsions of nature have mixed the soils of different localities; he will see, also, that the earliest vegetable growths were necessarily grosser sorts than those now produced; and that they, by receiving carbon from the atmosphere, for the carbon originally must have existed there in immense quantities, in the form of carbonic acid, by their decay deposited it in the soil, thus improving its quality and rendering it fit for the development of a more advanced class of vegetation. He will also see where and from what causes animal life progressed, and can trace its progress. He will clearly understand that such vegetable matters as were consumed by animals merely change the arrangement of their particles by such process, and that no one particle was put out of existence, but that by the decay of this animal and the change of the arrangement of the ultimate particles, both of themselves and their food, that they re-enter nature's great storehouse, the atmosphere and the soil, in a progressed condition; that thus both plants and animals have progressed to their present state.

He will next be able to observe why deeply disintegrated soils can never suffer from drought, because he will know that when water is absent from the soil it is present in the atmosphere, and will be deposited on the surfaces of colder particles, at greater depths than can be reached by atmosphere when attempting to percolate shallow plowed land. He can trace the action of this moisture and its office in the soil; he can know what amendments are required to replace those which he may find to be deficient; and, indeed, he can render himself doubly happy and a better servant of his Creator, and his vocation ameliorating to his fellow-men. All this must occur if he knows so much of nature's laws as will give his mind the first ability for closer observance, and his progression as an individual will be the natural consequence of its exercise. All this does not call for the tedious exertions of thought as practised by the mathematician and the merchant, but merely for the culture of the power of observation to see truths as they exist, and apply them rightly; and, this, and nothing else, he will find to constitute the science of agriculture.

THE BENEFITS OF EVENING SCHOOLS.

A committee of the Board of Common School Trustees in the City of Toronto, have been appointed to consider the propriety of establishing Evening Schools, has thus reported:

The Committee, after a careful consideration of the educational wants of the citizens, and an examination of the benefits of such institutions in those cities in which, for some time, they have been in operation, believe that no system of general education can be complete without the establishment of evening schools, and strongly recommend the opening at an early day of such classes, both for males and females, as the wants of the city demand, and the means at the disposal of the Board will permit.

Your Committee consider that such schools will prove highly beneficial to three classes of the community. I. In the first place there are those more advanced in years whose early education has been partially, if not entirely neglected, but who, aware of the advantages to their business, as well as the respectability, which arise from even a small amount of education, are now desirous of availing themselves of the only means within their reach of acquiring those benefits. 2. A second class is composed of youths of various ages, who, either from unwillingness to go, or from the inability of necessitous parents to spare them, do not attend the day school. This is a numerous class in other cities, and one whose presence has been attended with much trouble to the teachers and but little benefit to themselves; still, it is a class that cannot be wholly overlooked in the consideration of this important question. 3. A third and perhaps the largest class, and one which is likely to constitute the chief portion of our schools, is that composed of those who have already attained a certain amount of information, and who are desirous of adding to it at those hours when free from their ordinary avocations and employments. Evening schools meet the wants of this large and interesting portion of the community, and therefore, both on economical and moral grounds, we are bound, so far as we are able, to satisfy these wants. The Committee, deeply sensible that the substantial benefits conferred upon society by such schools cannot be estimated in pounds and pence, and fully aware that they are regarded favorably by all classes of our citizens, cannot, however, under present circumstances, recommend the Board to do more than make a commencement by way of experiment, during the present season. The building of new school-houses and the perfecting of our admirable system of Common School Education, have necessarily entailed heavy expenses upon the city. Add to this that the item of evening schools was overlooked in the Board's estimate of the current expenditure of the year, and the Committee think the desirableness of restriction will be apparent.

The Committee, therefore, would recommend the immediate establishment of but one central male evening school—that one of the rooms in the Victoria Street school should be appropriated to that purpose, that one teacher, at a salary of £50, be engaged to conduct the classes —that these be open for five evenings each week from 7 to 9½ o'clock, beginning on the 15th October, and ending on the 15th April following.

The Committee had some difficulty in determining as to the propriety of employing to conduct the evening classes, those teachers already engaged in some of the public day schools. While in some places, this double duty has been thought too burdensome to the teachers, in other cases, it has been found that they were able to discharge both offices satisfactorily to themselves and to their employers. In the present position of our city schools, the Committee deem it, on the whole, the safest plan to employ a separate teacher for the evening duty.

The Committee on Evening Schools beg further to state that, all necessary arrangements having been made, the evening classes were opened on the 15th instant. They are happy in being able to say that the numbers who presented themselves for enrolment as scholars far exceeded their expectation, there being ninety-seven present on Monday, and one hundred and forty on Tuesday evening.

REMINISCENCES OF THE PARIS INDUSTRIAL EXHIBITION.

Steam Engines.—Many persons suppose that the French people know but little about steam engines, and that their number is very limited in France. This is a mistaken idea; for steam engines of remarkable beauty, and in great numbers, are made and used in that country. While in Paris, those exposed in the grand Exhibition impressed us favourably, both with regard to the simplicity of their character and the highly cultivated taste displayed in their style of execution. The favourite and most common steam engine used in France is the double horizontal kind—that is, two cylinders yoked at right angles to one shaft. They are mostly low-pressure and condensing. The pumps and condenser are placed below, and are worked by eccentrics from the main shaft, and thus they are very compact. The engines of the river boats are of this construction, and a number of these were on exhibition; but not a single large marine one. Some small ones, however, were on exhibition; and one of 30 horse-power, as a working model, by Tod & McGregor, of Glasgow, Scotland, of the steeple class, was well made, but we did not like it; we prefer greater simplicity—such as is now attained in the marine engines built in New York. M. Gache, of Nantes, exhibited a double-horizontal river boat engine; and so did M. Creusot, the largest maker of this class of engines in the country. One from Holland, by M. Cail, was justly admired for its workmanship, and gave evidence of the mechanical skill of the genuine Dutch. An engine from Birmingham, England, gained more notice for its elaborate finishing than most of those exhibited, but it did not show such harmony of proportion and skilful arrangement of parts as those made in France. All the large engines for factories in France have double cylinders, and are said to insure perfect steadiness and regularity in working the machinery. Some very large ones of this class were exhibited; but the most unique, for the purpose of insuring a smooth motion, was a small engine having three cylinders, with their piston rods so yoked as to overcome all the difficulty of *dead points*. Three-cylinder engines are not new, nor are they commendable, as two cylinders can accomplish the same objects with sufficient accuracy, and are certainly much cheaper. We did not attempt to count all the engines exhibited—their number was too imposing for this task. The French locomotives, in contrast with the English ones—and there were quite a number of both—exhibited superiority both in construction and finish. This surprised us not a little, as we did not expect to find such engineering excellence in France, especially when compared with the parent country of the locomotive; but when we remembered that M. Seguin, of the St. Etienne Railway, first greatly increased the heating surface by his tubular locomotive boilers, patented in 1828, and that M. Pelletan early applied the steam jet to increase the draft of the fire, we could not but admit that too little credit has been given to France for what she has done to improve the steam engine. The French locomotives did not appear to be any better than the English ones; but while they exhibited as much power, they displayed a greater artistic finish and beauty of design. Both English and American engineers might learn a lesson from those of France, with respect to combining beauty with usefulness in designing machinery. France, like all other countries, has her enthusiasts, and perhaps in greater numbers. We thought so while looking at an engine by M. Paschal, propelled with steam, smoke, and hot air, and which has made nearly as much noise in Paris as the *Ericson* did in New York. Air is forced in small jets through an annular furnace, surrounded with water on the outside, where the steam is formed, and from which it is taken to mingle with the heated air and products of combustion of the furnace, thence into the cylinder to operate the piston. The working cylinder itself is also heated by a grate, but all the other parts of the engine are the same as those in common use. Its results, so far, have not come up to the anticipations of its admirers and advocates, and never will. It however shews that the French engineers are not of the stand-still order. Without such experiments no improvements could ever be made.

Iron and Steel.—The display of iron and steel manufactures greatly interested us, more especially the productions of Prussia. As at the World's Fair in London, in 1851, so at the Great Exhibition in Paris, 1855, M. Krupp, of Berlin, Prussia, made by far the finest display—surpassing both the French and English steel and iron makers. The Exhibition in London must have done good, for those who witnessed it have confessed that M. Krupp has improved upon his samples of fine steel there exhibited; and it will not be forgotten how these were admired and spoken of. His iron books, with leaves thin as paper, were described as the most wonderful achievement in the science of iron making. We must confess that it was impossible to ascertain whether France, Germany, or England occupied the first place for iron products. So far, however, as it relates to commercial utility—cheapness of product—England surpasses all the others; but the products of each, taking a general view of them, were nearly alike—massive and beautiful. There were huge iron rails, 60 feet long, and iron girders of equal length. There were iron plates for the new French gun-boats, 30 feet long, 6 feet wide, and 4 inches thick, made by M. Cave & Co., and intended to knock down with impunity the granite walls of fort and citadel. There were also displayed sheets of iron 30 feet long, and as many wide; and M. Petin & Co. displayed steel tires, for locomotive wheels, 15 feet in diameter. The wheel adopted on all the French lines of railroad is composed of a corrugated steel disk bound to a steel tire, and a solid hub pierced for the axle. These are stated to be cheaper and stronger than any other kind—the cheapness having reference to durability. One large wheel, 18 feet in diameter, forged wholly of iron—nave, felly, and spokes—exhibited by a M. Gouin, attracted much attention for its huge proportions, and the massive machinery required to forge it. We were not prepared to see such masses of iron forged into wheels, beams, and plates: but the Titan power of steam is equal to the task. Those on exhibition were worth a voyage across the Atlantic to behold.

BOOKS AND PRINTING AT THE FRENCH EXHIBITION.

We extract from *L'Illustration* the following interesting article occasioned by the exhibition of the art of printing at the Great Exposition at Paris:—

In examining the literary works and the specimens of the different graphic arts which are to be seen in the Exposition, it is easy to conceive that the developement of printing has been in each country proportionate to the development of its literature and the influence it exercises upon other countries. For what reason are the books of Italy, Spain, Portugal and other secondary states, scarcely represented at all in the Palace of Industry? It is because the modern literature of those countries, although not wanting in local importance, yet does not possess a European character, and their typographical productions cannot enter into competition with those of the great nations of Central Europe; because, also, the demand for the books of those countries is much less considerable than that which appertains to a literature sought for by all nations.

We regret not the less deeply that there should be almost an entire absence in this Exposition, of books from many of the secondary states of Europe. The literary decline of Italy and Spain is a result of their political fall. Literature, printing, and bookselling is not what it would have been if the national life had followed a progressive march. Notwithstanding this, we should be surprised were we aware of the literary strength of these countries, and could see the most important publications which have been issued within a few years. France, Germany and England whose literature is the most important of the nineteenh century, have each in this Exposition most interesting collections of books, engravings, and illustrated works. We shall occupy ourselves more especially with the specimens from the imperial printing offices of Paris and Vienna, also with the exhibitions of Messrs. Didot, Pion, Claye, etc., who represent the graphic arts, so called, in their rich collection of works from the first publishers in those three countries.

After France, it is Germany which exhibits the largest number of typographical specimens. There are nevertheless, few publishers who have decided to take part in the trial. The English also, merit the same reproach; but with them typography, although not wanting in great importance, is not, nevertheless, the stamp of national industry as exemplified in Saxony. We learn that in Leipsic alone there are not less than one hundred and forty-five book publishers, who are only represented here by four or five houses, which give a very feeble idea of the importance of the largest market for books that exists in the world. It is our intention to devote ourselves more to the value of the works exhibited as objects of industry and art, than as to their moral and scientific value. Before examining from this point of view it would, perhaps, not be without interest to give the reader some details as to the actual state of typography and bookselling in France, England and Germany.

It is difficult to state in which of the three countries printing has made the most progress. The beauty of the type used in Germany is fully equal to that of France and England, and in this connection Germany has made remarkable progress. They have given up also, the bad habit of printing on thin paper, which made the perusal of of German publications so fatiguing. Now, the most common works are produced with an elegance which permits of their comparison with French and English editions. France, celebrated not alone in its editions *de Luxe*, but also for its large market for more common publications, has not neglected neatness and beauty in its printing, which advantages become the property of the public, owing to the low price

at which they are furnished, in comparison with German and English books. The French language being spread to so much more extent, French publishers are enabled to issue a larger number of copies. The German editions being so much smaller, are in consequence, more extensive.

This fact, of which Germans as well as foreigners complain, is also owing to another cause. In France all important works are published in or near Paris. England has also but two capitals for the supply of books, London and Edinburgh. The French publisher has for his publications a more certain demand than the German. He does not send out as the latter does books on sale, and he does not give to agents so large a discount. The credit for books in France is but three or six months, whereas in Germany it is often a year. The Germans also print too large editions, as it often happens with the works of those authors whose fame is not yet established, and in consequence remain on the shelves of the publisher, proving a bad speculation.

The book business in England is organized upon a plan very similar to that in use in France. The system in Germany often proves ruinous to the publisher; copies of new publications are sent to the various country dealers, who often return all of them at the end of the year. This system, which distinguishes Germany from most other countries, belongs essentially to its social constitution. The existence of so many capitals and large towns, each serving as a centre for science and art, renders it almost impossible to centralize the book publishers at any one point. Each small village has its book agent, who, without much stock on hand, will procure for you any work at a few days' notice.

Publishers send their literary novelties to all the country agents, who, in their turn, distribute them through all the corners of Germany. From the facility with which one can thus learn about books, without purchasing, results the fact that many publications are well read without paying much to the publisher. In no other country in the world does there appear as many new publications as in Germany. We find in Brockaus' Conversations Lexicon, the number of books published annually since 1564—during which year a catalogue of books was commenced at the Leipsic Fair, which has been continued uninterruptedly to the present day. In the year 1564, the number of new publications was two hundred and fifty-six.

In 1589	362
In 1601	1,137
In 1701	1,025
In 1765	1,517
In 1789	2,115
In 1814	2,529
In 1825	4,836
In 1830	5,920
In 1846	12,426
In 1847	10,934
In 1848	18,168
In 1849	8,497
In 1850	8,737

Showing that in 1846, a larger number of works was published than in any year before or since.

France stands next to Germany in the number of its publications. In 1817, there were published but two thousand one hundred and twenty-six new works: but in 1826, there were four thousand three hundred and forty-seven. In 1833, six thousand and sixty-eight; in 1850, seven thousand two hundred and eight, of which four thousand seven hundred and twelve were issued from Paris.

The literary movement in England has followed an analogous progression. In 1828, there were published in London eight hundred and forty-two; in 1835, twelve hundred and forty-three; in 1850, forty-four hundred new works. It will be seen that this result is inferior to that of Germany or even France. At the end of the year 1850, there were no less than two thousand booksellers in Germany; among this number, four hundred publishers and twelve hundred agents. The largest number of bookstores are to be found in Berlin, where there are, at present, one hundred and seventy-nine. As stated before, Leipsic has only one hundred and forty-four. Vienna, with a much larger population than Berlin, has but fifty two book-stores—but the small city of Suttgart has fifty, and Frankfort thirty-six. To give some idea of the change which has taken place in the book business in Germany, we would state that in 1740, Berlin possessed but eight book-stores, and Leipsic thirty-one.

At the annual fair that takes place at the latter city, three hundred and forty publishers have been present. At that time, all large sales of new publications took place at Leipsic, owing to the difficulties of communication. At present the fair is used more as a rendezvous for those wishing to settle their yearly accounts, than for purchasing. An association of book publishers was formed in Leipsic in 1836 for the better organizing the correspondence of publishers and dealers, and also for transmitting books from one town to another. By means of this organization, the price of books never varies, even in the most distant cities. The facility for procuring books, which exists in Germany, exercises a great influence over the instruction of the people. When we also know that thirty-two of the German cities possess large public libraries, and that it is rare to find a small village without its reading-room, we shall not wonder at the increase of literature in that country.

Miscellaneous.

ONE BY ONE.

From "Household Words."

One by one the sands are flowing,
One by one the mountains fall;
Some are coming, some are going,
Do not strive to grasp them all.

One by one thy duties wait thee,
Let thy whole strength go to each,
Let no future dreams elate thee,
Learn thou first that these can teach.

One by one (bright gifts from Heaven)
Joys are sent thee here below;
Take them readily when given,
Ready too to let them go.

One by one thy griefs shall meet thee,
Do not fear an armed band;
One will fade as others greet thee,
Shadows passing through the land.

Do not seek at life's long sorrow;
See how small each moment's pain;
God will help thee for to-morrow,
Every day begin again.

Every hour that fleets so slowly
Has its task to do or bear;
Luminous the crown, and holy,
If thou set each gem with care,

Do not linger with regretting,
Or for passing hours despond;
Nor the daily toil forgetting,
Look too eagerly beyond.

Hours are golden links, God's token,
Reaching Heaven; but one by one
Take them, lest the chain be broken
Ere the pilgrimage be done.

ENGLAND AND HER COLONIES.

The commerce of Great Britain with her Colonies, already exceeds that with all foreign countries. Mr. Disraeli stated on one occasion in Parliament, that in fifteen years Great Britain had exported to the Colonies, in the article of calico, (313,000,000) THREE HUNDRED AND THIRTEEN MILLIONS YARDS MORE THAN TO ALL OTHER PARTS OF THE WORLD. This Colonial Empire supplies the mother country, annually according to official returns 4,000,000 lbs. Cocoa; 1,000,000 lbs. Cinnamon; 6,000,000 lbs. pepper; 2,000,000 gallons Vegetable Oils; 8,000,000 lbs. Indigo; 40,000,000 lbs. of Wool; 1,000,000 yds. of Silk; 24,000,000 lbs. of Rice; 100,000,000 lbs. Cotton Wool; 35,000,000 lbs. of Coffee; 168,000,000 brls. of sugar; with other articles to an infinite amount; with timber in almost an incalculabe quantity and with minerals and even the precious metals, by hundreds of tons.—Newfoundland alone, small and barren as she is, has contributed already to the wealth of the mother country in the vast sum of £200,000,000 sterling! Nay, were the commerce of Britain with all foreign countries suspended, her own Colonial Empire would occupy her shipping, receive her surplus population, consume her exports, and send her back in return all the luxuries and necessaries which her millions of home subjects require. The portion of this vast empire with which we are the most intimately connected is, the British possessions in America, larger in extent than all Europe, and unsurpassed in natural ressources. The export and import trade with these Colonies amount to upwards of $50,000,000 annually. The tonnage of the shipping employed in this trade, is nearly 2,500,000, yearly. The export trade of Canada alone reached in 1851 the enormous amount of $18,000,000, and has since gone on gradually increasing. In that year the value of our Canadian Forests was upwards of $14,984,000; of Agriculture, $4,000,000; of the Seas, $204,900; and of the Mines, $79,000. The revenue of her Canals, $210,000, and her whole revenue upwards of $80,000,000, being an to that vast Colonial Empire, which constitutes at once the glory,

excess over the expenditure of $700,000. We have thus briefly referred greatness, and life of Great Britain. Its importance to the parent country has been noted; and whoever seeks its dismemberment, is not only an enemy to the Colonies themselves, but also an enemy to the mother country. While they stand, she stands firm and impregnable. Her interests are identical with the interests of the Colonies,—her children. "*Render these useless,*" said the sagacious Talleyrand, "*or deprive her of them and you break down her last wall—you fill up her last mote!*"—*Kingston Whig.*

THE COLONIES AND THE PATRIOTIC FUND.

In a parliamentary paper yesterday was published a statement of all the remittances received up to the present time from the colonies on account of the Patriotic Fund. The total sum, including grants from colonial Governments, is £143,358. This is exclusive of £10,000 from Canada and £500 from the Mauritius for the French army. Of this, India contributes £56,630; of which, £30,0 0 is from Calcutta, £13,000 from Bombay, and Madras £11,837. The Australian colonies give £38,948; of which New South Wales sends £30,000, South Australia £6,000, Van Diemen's Land £1,948, and Victoria £1,000. From Canada comes £18,374; and among the subscriptions which make up that sum we find "Mohawk Indians of the Bay of Quinte." contributing £8, the Rice Lake Indians, £57 2s. 6d., and the six Nations Indians £100. Nova Scotia sends £4,944; New Brunswick, £4,107; British Guiana, £4,000; Ceylon, £3,551; Hong Kong. £2,216; Prince Edward's Island, £2,002; Gibraltar, £1,508; Jamaica, £1,066; Malta, £842; the Cape, £473; Mauritius, £632; Trinidad, £500; New Zealand, £441; Barbadoes, £403; Bermuda, £405; the smaller West India Islands various sums. The lowest is Tortoli, which has contributed £3.

A PIOUS SOLDIER.

The following touching letter was written on the eve of battle by Col. Shadforth, of the 57th regiment, British army, who fell in the attack on the Redan, on the 18th of June :—

"BEFORE SEBASTOPOL, June 17—6 P. M.

"*My own beloved wife and dearly beloved children:* At one o'clock to-morrow morning, I head the 57th to storm the Redan. It is, as I feel, an awfully perilous moment to me, but I place myself in the hands of our gracious God, without whose will a sparrow cannot fall to the ground. I place my whole trust in Him. Should I fall in the performance of my duty, I fully rely in the precious blood of our Saviour shed for sinners, that I may be saved through Him. Pardon and forgive me my beloved ones, for anything I may have said or done to cause you one moment's unhappiness. Unto God I commend my body and soul, which are His; and should it be His will that I fall in the performance of my duty, in the defence of my Queen and country, I most humbly say, 'Thy will be done.'—God bless and protect you; and my last prayer will be, that He, of His infinite goodness, may preserve you. God ever bless you, my beloved Eliza, and my dearest children, and, if we meet not again in this world, may we all meet in the mansions of our Heavenly Father, through Jesus Christ. God bless and protect you; and ever believe me,

Your affectionate husband and loving father,

THOMAS SHADFORTH."

Educational Intelligence.

CANADA.

MONTHLY SUMMARY.

Quite a number of Students offered themselves for matriculation at the recent examination in the University of Toronto....The autumn term of Victoria College has commenced with one hundred and fifty pupils and Students....A building is about being erected at a cost of £400, in the city of Ottawa (Bytown), to be called the Victoria Academy. The *Ottawa Citizen* in referring to the subject says: "The example that has been set by the founders of this Institution in erecting a neat and commodious building will, we hope, be speedily followed in other quarters. And certainly, the sooner the better; for the present condition of our Grammar or Common School buildings is anything but agreeable to the teachers or creditable to the city. It would be difficult to assign any reason why this city should not become as celebrated for the excellence of its Educational Institutions as it is already for the salubrity of its climate, and the beauty of its natural scenery ...The Board of School Trustees in the city of Toronto are about taking steps to "obtain competent gentlemen to deliver instructive and interesting lectures in some of the City Schools during the winter months."

BRITISH AND FOREIGN.

MONTHLY SUMMARY.

The Rev. Edward St. John Parry, lately Professor in Trinity College, Toronto, has been unanimously elected resident warden of Queen's College, Birmingham....The *Globe* says: "Dr. George Wilson, brother of Dr. Daniel Wilson of this city, has been appointed by Her Majesty to the newly erected regius Professorship of Technology in the University of Edinburgh. Dr. Wilson in a note to the Lord Provost, transmitting Her Majesty's commission appointing him to the chair, informed his lordship that there was no exact equivalent in English for giving a rendering of what was embraced under Technology, but the nearest deficient was physical science in its application to the useful and economic arts, the fine arts not falling under the province of Technology. The benefits of the chair will not be confined to the students of the University, but will be extended to all whose attention is directed to the useful arts."....The *Globe* also states that: "The chair of the Practice of Medicine in the University of Edinburgh, is at present vacant, in consequence of the resignation of Dr. Allison, who has long occupied a place in the very highest ranks of the medical profession in England. Dr. Allison is a brother of Sheriff Sir Archibald Allison, the celebrated historian of the last European War."....It is announced that from the 1st of October a class will be formed in the University of Dublin, for the especial instruction of students who may present themselves as candidates at the next examination for appointments in the Royal Artillery and Engineers.... The committee of the Roman Catholic University of Ireland have received £12,000 during the last year.

EDUCATION IN AUSTRALIA.

A recent correspondent of the London *Times* states that "The question of public education has again occupied for some time the attention of our Legislative Council, and the discussion has excited, as the discussion of this subject generally does excite, a good deal of acrimonious feeling and keen debate. In connexion with the subject of education it may be proper to state that the first term of the Melbourne University was opened in due form on the 14th inst., by his Excellency the Lieutenant Governor, in the presence of the Chancellor, the Vice-Chancellor, the Council of the University, and a number of other colonists.

YALE COLLEGE.

The total number of Students in Yale College, according to the "Banner," is 617; of instructors, 41. The Students are divided as follows: Theology students, 25; Law students, 22; Medical, 34; Scientific, 60; Seniors, 96; Juniors, 110; Sophomores, 113; Freshmen, 157. The whole number in the Undergraduated Department is 476. It is noticed with regret that the departments of Law, Medicine and Theology are gradually falling off. Something ought and might be done to avert this decline, which if not checked, will soon deprive Yale of any claim to be considered a University or anything like one.

Literary and Scientific Intelligence.

MONTHLY SUMMARY.

We regret to notice in our foreign exchanges the death of the Rev. Thos. Pearson, author of the valuable work on Modern Infidelity....The poet Longfellow is engaged, it is said, upon a translation of Dante, which will be ready for the press sometime next year....The library of the late Thomas Moore, presented by Mrs. Moore, as a memorial of her husband's taste and erudition. to the Royal Irish Academy, has arrived in Dublin....Mr. J. D. Fitzgerald, M. P., has offered £100 towards establishing a public library in Ennis, under the new act for promoting free public libraries and museums in Ireland. Writing to Mr Marcus Talbot on the subject, he says, "I will myself present £100 for the purchase of some standard scientific works, or books of reference, and I will undertake the supply of a complete set of parliamentary papers, and promise an annual subscription."

PUBLIC LIBRARIES AND MUSEUMS IN ENGLAND.

An act was passed in the late session (18 and 19 Victoria, chap. 70) for further promoting the establishment of free public libraries and museums is municipal towns, and for extending it to towns governed under local improvement acts and to parishes. The Public Libraries' Act of 1850 in repealed, and under this act the admission to the public is to be free of all charges. Town councils may adopt the act if determined upon by the in-

habitants, and the expenses are to be paid out of the borough fund. The board of any district within the limits of an improvement act, may under similar circumstances, adopt the act. Upon a requisition of at least ten rate-payers, a meeting of the parish may be called, and if two-thirds of the rate-payers then present shall determine, the act shall come into operation in the parish, and the expenses of the same are to be paid out of the poor-rate. Further the act provides that if any meeting called in any borough, district, or parish, shall determine against the adoption of the act, no meeting for a similar purpose shall be had for the space of one year at least from the time of holding the previous meeting.

REPORT OF THE DEPARTMENT OF SCIENCE AND ART IN ENGLAND.

The report of the department of science and art, from the pen of Dr. Lyon Playfair, has just been published in the form of a blue-book, with numerous and lengthy appendices. It is dated the 1st January last. Dr. Lyon Playfair sums up his report by observing generally, that the department has made a marked advance in extending instruction in art to elementary schools; 10,500 children having received such instruction through its agency. In concert with the Committee of Council on Education, it has enabled 1,044 teachers of public schools to learn drawing at the local schools of art, with a view of introducing it into their own schools, and 1,270 masters, at various training colleges throughout the kingdom, have been examined for certificates in elementary drawing. Means of illustrating the courses of instruction have been widely spread, and, in addition to the usual trade supply, 294 schools have obtained examples through the department, at an average cost of six guineas for each school. The local schools throughout the provinces have been attended by nearly 20,000 persons, chiefly artisans. The museums of the department have been visited by above 204,000 persons, and the Art Library at Marlborough-house by nearly 8,000. The exhibition of students' prize-drawings in the provinces has been inspected by above 66,000 persons, and the Botanical and Zoological Gardens in Dublin have had above 135,000 visitors. The Central Schools in London continue to be made as useful as possible to the schools throughout the kingdom, and have been the means of providing well-trained masters for the provincial schools. The public services connected with the department continue in an active state. In regard to the financial expenditure of the department, it is asserted that every effort for economy has been made, and, of the aggregate sum of £79,846 voted last year, it is expected that more than £17,000 will be repaid into the Exchequer at the close of the financial year.

EDITORS IN PARLIAMENT.

The press in England certainly cannot complain that it is not fairly represented in high places. The London Athenæum says: "There are more proprietors, editors, and correspondents of public journals in the present House of Commons than at any previous period. Among leading debaters in that House are to be found some of the most powerful writers of the day. The Chancellors of the Exchequer are men who have occupied equally distinguished positions in literature, and the Lords Lieutenant of Ireland are elegant essayists, pleasant versifiers, and accomplished authors of diaries. In fact, the distinction and antagonism between the worlds of politics and literature seem fast dying out to the advantage of both, we would fain believe. While the one becomes more enlightened, it is to be hoped the other will gain in robustness and healthiness of tone."

CONVERSION OF THE ARABIAN DESERT INTO AN OCEAN.

Captain William Allen, of the British navy, has published a book advocating the conversion of the Arabian Desert into an ocean. The author believes that the great valley extending from the southern depression of the Lebanon ranges to the head of the Gulf of Akaba, the eastern branch of the head of the Red Sea, was once an ocean. It is in many places, 1,300 feet below the level of the Mediterranean, and in it are situated the Dead Sea and the Sea of Tiberias. He believes that this ocean, being cut off from the Red Sea by the rise of the land at the southern extremity, and being only fed by small streams, gradually became dried by solar evaporation. He proposes to cut a canal of adequate size from the head of the Gulf of Akoba to the Dead Sea, and another from the Mediterranean, near Mount Carmel, across the plain Esdrælon, to the fissure in the mountain range of Lebanon. By this means the Mediterranean would rush in, with a fall of 1,300 feet, fill up the valley, and substitute an ocean of 2,000 square miles in extent, for a barren, useless desert; thus making the navigation to India as short as the overland route, spreading fertility over a now arid country, and opening up the fertile regions of Palestine to settlement and cultivation.

THE CANADIAN INSTITUTE OF UPPER CANADA.

As the Canadian Institute is a Provincial institution, and numbers among its members persons residing in all parts of Upper Canada, we have much pleasure in transferring to the columns of this *Journal* the following notice from the *Globe*:—This flourishing institution, which already reflects so much credit on the Province, has experienced its share in the vicissitudes which have affected so many of our local bodies in consequence of the transfer of the Seat of Government to Toronto. The following circular, which has been prepared for circulation among the members and friends of the Institute, will best explain the nature of the plans contemplated, in consequence of the changes forced upon it by the deprivation of the rooms temporarily occupied in Government House. Mr. G. W. Allan, whose valuable gift of land gave the first impetus to the movement for permanent buildings, has since, we learn, greatly enlarged his gift. The site originally presented by him measured 90 feet of frontage by 150 in depth. But at the last meeting of the Council of this Institute, Mr. Allan intimated his intention of augmenting it by the addition of the adjoining lot, measuring 64 feet in frontage, thereby presenting to the Institute an area measuring altogether 154 feet front by 150 feet in depth; a site which will amply admit of every augmentation that the most sanguine of the friends of this institution can hope for, for many years to come. It now remains for the members and friends of the Institute to do their part, and we feel assured the following appeal to their liberality will not be made in vain:—

Circular from the Council of the Canadian Institute.

The anticipated removal of the Seat of Government to Toronto, and the consequent ejectment of the Canadian Institute from the rooms allotted to them in the old Government House, has forced on the attention of the Council the necessity of providing accommodation for the Institute in a building suited to the purposes for which it is established, and to the position which it has already achieved as a Provincial Scientific Institution. In taking the requisite steps for this purpose, one great difficulty has been removed—by the gift, by G. W. Allan, Esq., of a valuable site in Pembroke Street, on the Moss Park Estate; and on application being made to the Government, two successive grants of £500 each have since been obtained in aid of the Building Fund. Under these very favorable circumstances, the Council have determined upon appealing to the Members of the Institute, as well as to all persons likely to feel an interest in the success of the first purely scientific institution founded in Upper Canada. The Council anticipate that at least £500 may be thus readily obtained, thereby increasing the building fund to £1,500, and providing a sum which will justify them in commencing immediate operations. The building which the Council propose to erect is designed with a view to admit of additions hereafter, so as ultimately to provide accommodation for the Museum, Library of Reference, Reading Room and apartments for transacting the ordinary business of the Society; the present cost not to exceed £2,500. It is proposed that the subscriptions be paid either at once or in the following manner: one-fourth immediately, and the remainder at six, twelve, and eighteen months thereafter; the mode of payment being at the option of the donor. Gentlemen proposing to subscribe are requested to transmit their names, with the remittances, or a statement of the amounts they intend to subscribe, to the Treasurer, James Stevenson, Esq., Bank of Montreal, Toronto, as speedily as possible, in order to enable the Council to commence the building without delay. Building Committee: G. W. Allan, Esq., D. Wilson, L.L.D., H. Croft, D. C. L., F. W. Cumberland, Esq.

THE FIRST TIME KEEPER MADE OUT OF CLAY.

M. Raby writes, from Paris, that this great industrial achievement was deposited at the Exhibition on August 22, and that it was inspected by the Queen and Prince Albert with amazement and admiration. The following is an extract from his letter:—"My famous pocket chronometer, made out of the precious aluminium, has been placed in the Panorama, alongside of the bars of the same metal; it keeps time very correctly. All the works, plates, cogs and wheels, are made of aluminium; and I really believe it is much better for purposes of this kind than the other metals generally employed. It is much lighter, does not require so much power to conduct the wheels, and therefore, with a heavy balance, will obtain a better result of regularity. It is very hard and smooth when hammered, and the friction will be reduced to almost nothing."—*London Mining Journal.*

VARIETIES OF SPEED.

The velocity of a ship is from 8 to 18 miles an hour; of a race-horse, 29 to 33 miles; of a bird, 50 to 60 miles; of the clouds in a violent hurricane, 80 to 110 miles; of sound, 823 miles; of a cannon-ball (as found by experiment, from 600 to 1000 miles; of the earth round the sun, 68,000 miles—more than 100 times quicker than a cannon ball; of Mercury, 104,000 miles; of light, 8,000,000 miles, passing from the sun to the earth in about 8 minutes, or about a million times swifter than a cannon ball.

NOTES ON SCIENCE AND ART.

Gold in the Arts—It has been ascertained that in Birmingham, England, not less than one thousand ounces of fine gold are used weekly, equivalent to some $900,000 annually; and that the consumption of gold leaf in eight manufacturing towns is equal to five hundred and eighty four ounces weekly, For gilding metals by electrotype and the water gilding processes, not less than ten thousand ounces of gold are required annually. A recent English writer states the consumption of gold and silver at Paris at over 18,000,000 of francs. At the present time the consumption of fine gold and silver in Europe and the United States is estimated at $50,000,000 annually.

Return of the Great Comet—The eminent astronomer, M. Babinet, member of the Academy of Sciences, and M. Bomme, of Middleburg, Holland, have been making some interesting investigations in respect to the return of the great comet which appeared in the years 104, 392, 682, 975, 1264, and 1556. M. Bomme has gone over all the previous calculations, and made a new estimate of the separate and combined action of all the planets upon this comet of three hundred years, the result of which severe labor gives the arrival of this rare visiter in August, 1858, with an uncertainty of two years, more or less.

Microscopic Photographs—Some microscopic photographs exhibited at Manchester, England, have excited much admiration. One of the size of a pin's head, when magnified several hundred times, was seen to contain a group of seven portraits of members of the artist's family, the likenesses being admirably distinct. Another microscopic photograph, of still less size, represented a mural tablet, erected to the memory of William Sturgeon, the electrician, by his Manchester friends. This little table covered only 1-900th part of a superficial inch, and contained 680 letters, every one of which could be distinctly seen by the aid of the microscope.

The Reading Bricks of Babylon—According to the Leeds (English) *Mercury*, Col. Rawlinson has just discovered among the ruins of ancient Babylon an extensive library—not, indeed, printed on paper, but impressed on baked bricks—containing many and voluminous treatises on astronomy, mathematics, ethnology, and several other most important branches of knowledge. These treatises contain facts and arguments, which, in his opinion, will have no small effect on the study of the sciences to which they relate, and, indeed, on almost every branch of learning, and which throw light upon Biblical history and criticism, and the history of our race.

THE Smithsonian Institution has adopted the following rules for the distribution of its publications:—

1. They are to be presented to all learned societies which publish transactions, and give copies of those in exchange to the Institution.

2. To all foreign libraries of the fiast class, provided they give in exchange their catalogues of other publications, or an equivalent in their duplicate volumes.

3. To all colleges in actual operation in this country, provided they furnish in return, meteorological observations, catalogues of their libraries and their students, and all other publications issued by them relative to their organization and history.

4. To all states and territories, provided there be given in return, copies of all documents published under their authority.

5. To all incorporated public libraries in this country, not included in any of the foregoing classes, now containing more than 7,000 volumes; and to smaller libraries, where a whole state or large district would be otherwise unsupplied.

6. Separate memoirs are sometimes presented to minor institutions.

THE BROCK MONUMENT.—Referring to the Brock Monument, the Niagara *Mail* says:—There will be but one column in the world superior in height to Brock's Monument, and probably not one exceeding it in beauty and position. The ground in the neighborhood of the column is covered with massive pieces of work; stone statues of warriors, lions, and elaborately carved work, that are to adorn the cornice of the pedestal capital and entablature of the column. Among these stands a colossal statue of General Brock, seventeen feet in height, which will be placed on the top of all. These figures are cut out of the same kind of stone which forms the monument, and are executed in a bold and flowing style that will give an aspect of much animation to the monument. They reflect much credit, indeed, upon the architect and workmen engaged.

Departmental Notices.

PROVINCIAL CERTIFICATES GRANTED BY THE DEPARTMENT OF PUBLIC INSTRUCTION FOR UPPER CANADA.

EDUCATION OFFICE, Toronto, 15th October, 1855.

The Educational Department, on the recommendation of the masters of the Normal School, and under the authority of the Upper Canada School Act of 1850, 13th and 14th Vict., chap. 48, has granted the undermentioned students of the Normal School during the Fourteenth Session, 1855, Provincial Certificates of qualification as Common School Teachers in any part of Upper Canada.

[Each Certificate is numbered, and recorded in the Register of the Department in the following alphabetical order; but the order does not indicate any distinction of merit in the class.]

FIRST CLASS.

Males.

307 William Carlyle.
308 David Ormiston.
309 John Harris Comfort.
310 John Jessup.
311 William Henry King.
312 Bernard Kerr.
313 David Blair.
314 Alexander Lester.
315 John Taylor.

Females.

316 Josephine Witmore Clarke.
317 Kate Gunn.
318 Elizabeth Adams.
319 Emmeline Shadd.
320 Mary Brown.

SECOND CLASS.

Males.

321 Andrew Allison.
322 James Bowerman.
323 Alexander Campbell.
324 Henry Clarke.
325 James Hay, Junior.
326 Duncan Crane.
327 William Hackett.
328 James Keating.
329 John McPherson.
330 Alexander Campbell Osborne.
331 Gilbert Platt.
332 Samson Roberts.
333 Samuel Simpson.
334 David Johnston.
335 William Bernard Danard.
336 Henry Hicks.
337 Thomas Steele.
338 Alexander Thompson.

Females.

339 Eleanor Leach.
340 Elizabeth Eleanor Kennedy.
341 Mary Foster.
342 Elmira Flood.
343 Mary Lester.
344 Sophia Caroline McLean.
345 Margaret Cath. McDonnell.
346 Mary Ann Munyard.
347 Henrietta Simpson.
348 Susannah Robinson.
349 Amelia Robertson.
350 Sarah Elizabeth Tewksbury.

THE NORMAL SCHOOL.

The next session of the Normal School will commence on the 15th day of November. Candidates for admission must apply during the first week of the session.

TEACHERS' SCHOOL REGISTERS.

As a supply of School Registers are now being sent by express to the county clerks for gratuitous distribution through the local superintendents, parties requiring Registers should apply for them to their local superintendent. Should the stock of any county clerk be exhausted, it can be replenished on application to the Educational Department; but the Department should not be put to the additional inconvenience and trouble of supplying isolated school sections direct, (as is frequently done,) in addition to the local facilities which it has already given to supply wants of this kind. These Registers are supplied gratuitously by the Department.

PUBLIC SCHOOL LIBRARIES.

To Municipal and School Corporations in Upper Canada.

Until further notice, the Chief Superintendent of Schools will apportion *one hundred per cent.* upon all sums which shall be raised from local sources by Municipal Councils and School Corporations, for the establishment or increase of Public Libraries in Upper Canada, under the regulations provided according to law.

In selecting from the General and Supplementary Catalogues, parties will be particular to give merely the catalogue number of the book required, and the department from which it is selected. To give the names of books without their number and department, (as is frequently done,) causes great delay in the selection and despatch of a library. The list should be written on a distinct sheet of paper from the letter, and attested by the corporate seal of the Trustees or Municipalities applying for libraries.

SCHOOL MAPS AND APPARATUS.

The Legislature having granted annually, from the commencement of the current year, a sufficient sum of money to enable this Department to supply Maps and Apparatus (not text-books) to Grammar and Common Schools, upon the same terms as Library Books are now supplied to Trustees and Municipalities, the Chief Superintendent of Schools will be happy to add one hundred per cent. to any sum or sums, not less than five dollars, transmitted to the Department, and to forward Maps, Apparatus, Charts and Diagrams to the value of the amount thus augmented, upon receiving a list of the articles required by the Trustees. In all cases it will be necessary for any person, acting on behalf of the Trustees, to present a written authority to do so, verified by the corporate seal of the Trustees.

EDUCATION OFFICE,
Toronto, 18th June, 1855.

COUNTY OF YORK.

LIST OF TEACHERS to whom CERTIFICATES were awarded at the Annual Examination of the County Board, 1855, to be in force until the 30th Sept., 1856—TEACHERS holding FIRST CLASS CERTIFICATES not re-examined.

CERTIFICATES RENEWED—

By the Board Meeting of the City of Toronto, 1st August, 1855.

FIRST CLASS.

Sarah Carruthers.	Jno. McIntosh.
Thomas Baxter.	Thomas Edy.

SECOND CLASS.

A. Robinson.	R. Kerr, Jr.
Jos. Hodgson.	D. McCallum.
W. McIntosh.	D. McKay.
Jas. Broley.	H. Matthews.
J. Mc. Coffuy.	Jas. Elliot.
R. Hall.	J. H. Fleming.
H. Maitia.	J. Fleming, Jr.
Thos. McDonald.	H. McPhail.
J. T. McLelland.	T. Milne.
T. S. Neeley.	Geo. Kirkpatrick.
Geo. Leitch.	H. Tearle.
Robt. Kerr.	Chas. McLelland.

THIRD CLASS.

Jane Mc Ginnes.	Rd. Brown.

By the Board Meeting at Richmond Hill, 2nd August, 1855.

SECOND CLASS.

Edmund Dyer.	Henry White.
Frs. B. Wrach.	Wm. Hixer.
Jas. Hollingshead.	Jos. Hugill.
Jno. O'Leary.	Leander Taylor.
Matthew Long.	Alfred Turner.

SECOND CLASS.

Jas. Macey.	T. C. McKeown.
Thos. Aurley.	Robt. McKeown.
Alex Smith.	Alexr. Campbell.
W. H. Meredith.	Jno. Bruce.
Neil McKinnon.	Wm. Davison.
Benj. Boud.	Wm. Steele.
W. L. Ralph.	Melinda Clarke.
Chas. Whitwell.	Glouana Clinie.
Hugh Allan.	Susan Oves.
J. S. Oves.	J. Whulock.
Geo. Owen.	W. D. Staith.
Wm. Irwin.	Mary Anne McGinnes.
A. McKinnon.	W. J. McKeown.

NOT LICENSED.

Jos. Hare.

THIRD CLASS.

W. Logan.

By the Board Meeting at Newmarket, 31st July, 1855.

FIRST CLASS.

Thos. McKee.	Peter Goodfellow, B. I.
Albert Andrews.	D. J. Moffat.
Wm. Anderson, I. C. B.	

SECOND CLASS.

R. C. Stewart.	Jos. Ross.
R. H. Evans.	Jean A. McPherson.
Geo. Harrison.	J. C. Moulton.
M. J. O' Sullivan.	Albert Kennedy.
Elizabeth A. Cuyler.	Jas. Hawkins.
Jno. Bulchait.	Theodore Winn.
Jno. Russell.	

THIRD CLASS.

Robt. Hamilton.	Caroline A. Doan.
Jos. Boag.	Samuel. J. Dougherty.
Andrew Power.	James Dougherty.
Eliza H. Lloyd.	Joanna Styles.
Jane Reddell.	Thos. Boyd.
Candace Styles.	J. N. Pointer.
Louisa Miller.	Anne Farquhar.
Jas. Gourlie.	Marilla Jerome.
Wm. Keith.	

Supplemental Examination, 16th October, 1855.

FIRST CLASS.

Wm. Hackett.	Elizabeth Kennedy.
Richard Lewis.	W. Kennedy.

SECOND CLASS

Alodzo K. Harvey.	Jane O'Flaherty.
Jas. Hawkins.	Wm. D. Fitzpatrick.
Jos. Edmunds.	Alex. Muir.
Thaddeus O'Reilly.	John Muir.
Jane Thompson,	

Toronto, Oct. 1855.

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