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AN ADDRESS

Delivered before the Mechanics' Institute, Toronto, Jan. 12, 1849,

BY THE CHIEF SUPERINTENDENT OF SCHOOLS FOR UPPER CANADA.

THE subject of my present Address is *The Nature and Importance of the Education of Mechanics, with special reference to Upper Canada*. This is one branch of a general subject which I have already discussed in two Lectures now before the public. I have considered education in reference to the Agriculture of our country—its "*Importance to an Agricultural People*." * I have also considered it in relation to our civil Institutions—its "*Importance to a Free People*." † I now propose to consider it in connexion with the trades and manufactures of our country—its *Importance to Mechanics*.

If this subject cannot attract by its dazzling brilliancy, it is commended by its practical utility. If it does not survey the heavens, or explore the earth, or traverse the oceans, or contemplate the wonders of ancient or modern cities; it relates to that without which the heavens could not be surveyed, or the earth explored, or the seas navigated, or cities erected. If it travels not over the history of nations, it has to do with the vital principle of all civilized nations. If it does not investigate any of the institutions or laws by which communities are incorporated into Provinces, or States, or Kingdoms, or Empires; it comprehends the tissue with which every part of them is interwoven, and without which society could not exist.

And yet, strange to say, this subject, so fraught with interest and importance, has scarcely formed the topic of a single remark in any of the discussions which have taken place in regard to the material and social advancement of our country. We have had much written on a system of University Education for the professions, but nothing on a system of Education for Mechanics and Tradesmen. We have many endowed schools and seminaries for teaching the Greek and Roman classics, but not one to teach the Practical Arts. Far be it from me to undervalue the importance of ample provision for liberal or university education; but I hold it, to say the least, not less important to provide for practical or Industrial Education, adapted to the trades and manufactures of the country. I believe that scientific mechanics and manufacturers are as important to the interests and prosperity of the country as classical lawyers and literary scholars. I rejoice in the advantages which the latter enjoy; but I deprecate the neglect of the former. And it is with the view of contributing something towards remedying such neglect, and of presenting the true interests of the mechanical classes, that I have selected the subject of the present Lecture—*The Education of Mechanics,—its Nature, its Importance, and the Provision necessary for its Attainment*.

I. I am, in the first place, to explain the nature of the education which ought to be sought and provided for mechanics. Education is the acquisition of that knowledge and that cultivation and development of our faculties—mental, physical, and moral—which

will fit us for our destined duties of life. In childhood and youth we should learn the principles of what we are to practice in manhood and old age. Education, properly speaking, is, or rather should be, practical life in principle; practical life is education in action.

It will be observed, that by education, I do not mean merely that which is taught in the school, nor merely acquiring knowledge; I mean all that is taught and learned at home as well as at school, every where and on all occasions,—all the principles that are imbibed and all the habits that are formed, from lisping infancy to legal majority—the parental stamp of character, the normal apprenticeship for life, and probably for eternity. To ascertain, then, the education proper for a mechanic, it is only necessary to inquire what will be his future position and employment in life? This will be chiefly three-fold, and will therefore determine the proper character of his preparatory education.

1. He will be a member of society; and, as such, he should know how to read and write the language spoken and written by such society; he should understand the relations and duties involved, and be acquainted in some degree with the ordinary topics of social intercourse. This supposes instruction in the grammar or structure of his native tongue; for I presume no one thinks that the mechanic, any more than other professional men, should be a murderer of the QUEEN'S English all the days of his life. It supposes also instruction in the correct and intelligible writing of that language—the language which is the vehicle of all his thoughts, the instrument of all his intercourse with his fellow-men and with the histories of other nations and of past ages. The instrument of language is more used than any other, and ought, therefore, to be better understood. The exercise in learning how to use it properly, involves a branch of mental discipline highly important to intellectual development, and to a proper standard of intellectual taste and pursuits. I have known many persons rise to wealth and respectability by their industry, virtues and self-taught skill; but from their utter want of training in the proper mode of writing, or speaking, or reading their native tongue, they are unable to fill the situations to which their circumstances and talents and character entitle them, and in which they might confer great benefits upon society. Let no parent who hears me impose such an impassable gulf between his sons and those rewards and positions of power and usefulness to which intelligent industry, enterprise and virtue conduct.

And if the intended mechanic should be trained to a mastery of his own native tongue, he should, on still stronger grounds, be instructed in the nature and importance of his social relations and duties. If he should be taught to speak correctly, he should also be taught to act uprightly. He should be correct in his actions as well as in his words. He should surely be not less grounded in the principles of morals than in those of language. If he is expected to be an honest man, he should be grounded in the principles of honesty; if he is expected to be a Christian man, he should be nurtured in the doctrines and precepts of Christianity. The conduct of the man is the development of his youthful training. It is the Christian and social virtues that form the basis, the cement, and the very soul of individual and social happiness; and it is a rare thing indeed, and contrary to nature, that a man in a Christian country will exhibit these virtues, and enjoy the advantages and happiness which they confer, who has not been taught them in his

* See *Journal of Education*, Vol. I, pp. 257-268.

† *Ibid*, pp. 239-301.

youth. Not that I suppose that education itself can make Christians; but it is a divinely appointed instrumentality for the accomplishment of that divine end. And it appears to me passing strange, how any man assuming the name of Christian, can neglect the Christian education of his son, while no pains or expense are wanting in making him a skilful grammarian. It was a just as well as beautiful remark I heard some years since from the lips of the eloquent Dr. Duff, that "knowledge is a double edged sword; and every thing depends on the arms that wield it. Wielded by religion, like MIDAS, it will turn all things into gold; wielded by irreligion, it must, like MEDUSA, turn all things into stone."

As a member of society, a mechanic should have some knowledge of the ordinary topics of social intercourse: and the foundation of that knowledge must be laid in a school acquaintance with Geography and the Elements of Natural and General History. No branches of knowledge are more easily acquired in youth than these; nor is the acquisition of any more grateful to the taste and curiosity of the youthful mind, especially when illustrated, as they always ought to be, by diagrams, objects and maps; nor is any other department of elementary learning so happily adapted to develop the social feelings and affections, and qualify any young person for the intercourse of life. For want of such knowledge, (and which if not acquired in youth is seldom attained to any considerable extent,) many a mechanic shuns intelligent society; and instead of seeking gratification and profit, and improving his leisure hours, in rational social intercourse or useful readings, he resorts to sensual indulgences and abandons himself to the lower propensities of the animal nature. As man's very nature is social—as he is formed for society, he must, and he will, in some form or other, fraternize with his fellow-man; and if the moral and intellectual part of his social nature be undeveloped by appropriate culture and exercise—if he be left a mere material being—a mere mass of bones and sinews and bodily appetites and passions, the animal propensities will of course become predominant, and the associations and habits will be of a like character. To counteract and subdue the lower appetites and passions of our nature, we must cultivate the higher powers and affections, and provide them with food and incentives for appropriate sustenance, exercise and enjoyment. The aspects and laws and productions of nature, which is the province of Geography and Natural History—the narrative of mankind, which is the theme of General History, are studies singularly adapted to enlarge and elevate the youthful mind as well as gratify and improve the youthful taste. The employment of mechanics brings them into contact with their fellow-men very much more than that of the agriculturist—and that contact must be for good or for evil according to their educational fitness for society; and therefore the social part of their education is proportionably important, and should be provided for with corresponding solicitude and care.

2. I observe, secondly, that the mechanic of Upper Canada is a member of a Free state; and, as such, he should have some knowledge of the constitution of government under which he lives, and of subjects relating to his rights and duties as a citizen. The civil rights of mechanics in this country are as extensive as those of the learned professions themselves; and as free men they have as much to do with the architecture of government as they have with the erection of cities or the productions of manufactures. As a free man, ought not the mechanic to understand the import of the term 'civil liberty?' And to understand that involves no small amount of political knowledge. As a free man, ought he not to be able to appreciate the civil polity under which he lives? And how can he do so rationally and intelligently, or except as a mere creature of prejudice, unless he studies its principles and developments? As a free man, ought he not to know his rights and how to exercise them? And how can he do so without study and reflection? As a free man, ought he not to be acquainted with his duties, and be able to perform them faithfully and for the good of his country, whether as an elector or as elected, whether as a witness or jurymen, a private citizen or public officer? And such knowledge is not the growth of instinct, but the fruit of a proper education, matured by subsequent observation and reflection.

The subjects at which I have thus glanced form, indeed, a part of a sound education for every inhabitant of Upper Canada, whatever may be his profession, trade or employment; but they are invested with peculiar interest in connexion with mechanical pursuits, from

the nature of those pursuits, and from the facilities which they afford for the acquisition of general knowledge, the cultivation of much social intercourse, and the exercise of extensive popular influence. I think I am warranted in saying, shame upon the parent who will inflict upon his intended mechanical sons the irreparable injury of depriving them of the advantages and happiness of such an educational preparation for their future position as members of society and citizens of a free country! But it is with the professional education of the mechanic that I have specially to do.

3. I remark, therefore, in the third place, that the intended mechanic is destined for a particular branch of human employment, and ought to have some knowledge of the nature of the substances with which he will have to do, as well as some acquaintance with the principles on which they may be moulded or modified and rendered subservient to his purposes. Mechanism has to do with almost every known substance in nature; and the principal departments of mechanics have each to do with many natural substances. Mechanicians, should, therefore, be acquainted with the nature of such substances as much as the professor of ancient or modern languages should understand their elements and structure, their idioms and literature, or as professor of mathematics should be conversant with the elements of EUCLID. Some branches of Mechanics, as well as Agriculture, have to do with the EARTH on which we tread, in the foundations of edifices, in preparing materials for several kinds of buildings and in erecting them, in constructing dams, roads, canals, and harbours, in providing the very window-glass by which our houses are lighted and the vessels with which our tables are furnished. It is, therefore, appropriate and desirable that the mechanic should have some knowledge of both the chemical and mechanical properties of that variously diversified substance which we call earth.

The same remark may be made, with additional force, in reference to the MINERAL SUBSTANCES which the earth contains, and without the use of which not a single employment of civilized life can be pursued, nor one of its blessings enjoyed. The chemical and mechanical modification and application of these substances embraces the whole circle of the arts, and no artisan should be ignorant of their properties and powers and laws.

And how much has mechanism to do with that *Fluid* substance which forms the ocean, intersects continents and islands with rivers and streams, which forms the motive power of many kinds of machinery and one of the essential elements of human subsistence, and the discovery and use of only one of whose mechanical properties, in the form of steam, has altered the character of most manufacturing employments, has modified the aspect, powers and relations of nations, and changed the commerce of the world. A knowledge of the mechanical properties and agencies of liquids is unquestionably an essential part of a sound mechanical education.

Scarcely less essential is it for the intended mechanic to know the properties and laws which characterize that elastic body or gas which envelops the globe we inhabit, which we inhale as a supporter of life, and on the laws and phenomena of which depend the structure of our dwellings and the rigging of our ships, the operations of machinery, the variations of the weather, the changes of the seasons, and the almost innumerable provisions and employments which result from them. Apart from the construction of musical instruments, and the pleasure we derive from sounds, there is hardly a single trade or branch of mechanical labour, the successful prosecution of which does not require some knowledge of *pneumatics*.

But mechanism has largely to do, and especially in this wooden country, with organized bodies; and, therefore, an acquaintance with the substances which enter into the composition of the vegetable kingdom—their proportions, principles of combination and decomposition—the laws which regulate the growth, strength, durability and decay of different kinds of plants and trees, ought not to be overlooked in the education of the intended mechanic. The enchanting field of vegetable physiology is an appropriate object of attention and study to every young person; but to the contemplated worker in wood of every description, an elementary knowledge of it is part and parcel of the proper preparation for his trade. And in such preparation I think the study of that unrivalled piece of mechanism which we call *MAN* ought not to be omitted.

The substances, then, on which mechanism operates, and the

elements with which its operations are connected, involve considerable departments of Chemistry, Mineralogy, Physiology and Natural Philosophy; subjects which it appears to me form essential parts of a good mechanical education. But the substances with which mechanism has to do, are to be formed into various implements, materials and structures, and controlled in various ways for the purposes of human life. This requires a knowledge of mechanical forces and the laws by which they are regulated; nor can these be calculated and determined without some acquaintance with Arithmetic and Geometry. And on the laws of Light, Heat and Electricity depend also unnumbered mechanical operations—the construction of edifices and instruments, and provisions for numerous wants and conveniences of human life; while the manufacture of the hats, clothes and shoes we wear, involves both chemical and mechanical processes of a multifarious character. The mechanic should likewise be able to delineate the objects of his actual and contemplated workmanship; but this he cannot do without some skill in Linear Drawing. He should furthermore know how to keep his accounts accurately and systematically; and for want of ability to do this many a mechanic has been involved in loss and ruin.*

Such are the principal subjects in which I think every youth should be instructed who is intended for mechanical pursuits. I have said nothing on what might be considered ornamental in his education; I have restricted my remarks to what appears to me to be essential—not indeed equally essential to every individual trade, but to mechanical employments generally. Nor would I convey the idea, that the School should teach trades, as the German Universities teach professions; but I mean that the School should teach the elements and principles of what the trades are the development and application, and that the intended tradesman should commence his apprenticeship with an educational preparation adapted to it the same as does the intended lawyer, or physician, or naval or civil engineer enter upon the study of his profession. It is true, a parent may apprentice his son to a trade without any such preparation; † but in doing so he closes up the way against the advancement of that son in his trade, and dooms him to the fate and temptations of hopeless inferiority for life.

II. Having given this very summary view of the nature of an education proper for a mechanic, it is my next duty to illustrate its importance. It is important in two respects:—first, to the mechanic himself—secondly, to society. It is also invested with a two-fold importance to the mechanic—involving both his *profit* and his *enjoyment*.

I. I remark then in the first place, that a good education is of great importance to the mechanic, *as educated labour is more productive than uneducated labour*. I will select my illustrations of the truth of this remark from examples the least favorable for its establishment—not where, as in this country, every operative mechanic is for the most part his own master, and needs greater intelligence and discretion for his guidance; but where the mechanical labourers are wholly under the superintendence of others, and may therefore be supposed to be least advantaged by educational training. From many similar illustrations which I might adduce, I will limit myself to two;—the one from Continental Europe, the other from the New-England States—the manufacturing workshop of America. In the Report of the English Poor Law Commissioners for 1841, will be found the evidence of A. G. ESCHER, Esq., of Zurich, in Switzerland—first a practical Engineer, and then a wealthy manufacturer—an illustration of

* So important is an elementary knowledge of these subjects of chemistry and natural philosophy, linear drawing, book-keeping, &c., to even the common employments of life, that they are embraced in the course of instruction given in the Provincial Normal School for the training of Teachers, with a view to their introduction into the Common Schools generally; and I anticipate the day when the teaching of them in our Common Schools will be regarded as much a matter of course, as the teaching of elementary arithmetic and geography is now.

† In the principal Cantons or States of Switzerland, (which are more democratic in their system of government than the neighbouring States,) a boy, before he can be bound as an apprentice to a trade, must pass a prescribed examination before a State Committee, as to his preparatory education, the same as candidates for the study of law in Upper Canada are required to pass a prescribed examination before examiners of the Law Society, in order to their admission as Students-at-Law.

the fruits of a good early education. In reply to the question of Her MAJESTY'S Commissioners, as to the effects of a want of education on the success of mechanical employments, Mr. ESCHER, who was accustomed to employ hundreds of workmen, states as follows:—

“These effects are most strikingly exhibited in the Italians, who, though with the advantage of greater natural capacity than the English, Swiss, Dutch or Germans, are still the lowest class of workmen. Though they comprehend clearly and quickly any simple proposition made, or explanation given to them, and are enabled quickly to execute any kind of work when they have seen it performed once, yet their minds, as I imagine, from want of development by training or School Education, seem to have no kind of logic, no power of systematic arrangement, no capacity for collecting any series of observations, and making sound deductions from the whole of them. This want of capacity of mental arrangement is shown in their manual operations. An Italian will execute a simple operation with great dexterity; but when a number of them is put together, all is confusion. For instance: within a short time after the introduction of cotton spinning into Naples in 1830, a native spinner would produce as much as the best English workman; and yet up to this time, not one of the Neapolitan operators is advanced far enough to take the superintendence of a single room, the Superintendents being all Northerners, who, though less gifted by nature, have had a higher degree of order and arrangement imparted to their minds by a superior education.”

In reply to the question, whether Education would not tend to render them discontented and disorderly, and thus impair their value as operatives, Mr. ESCHER states:—

“My own experience and my conversation with eminent mechanics in different parts of Europe, lead me to an entirely different conclusion. In the present state of manufactures, where so much is done by machinery and tools, and so little done by mere brute labour, (and that little diminishing,) mental superiority, system, order, punctuality, and good conduct,—qualities all developed and promoted by education,—are becoming of the highest consequence. There are now, I consider, few enlightened manufacturers, who will dissent from the opinion, that the workshops, peopled with the greatest number of well informed workmen, will turn out the greatest quantity of the best work, in the best manner. The better educated workmen are distinguished, we find, by superior moral habits in every respect.

“From the accounts which pass through my hands, I invariably find that the best educated of our work-people manage to live in the most respectable manner, at the least expense, or make their money go the farthest in obtaining comforts.

“This applies equally to the work-people of all nations, that have come under my observation; the Saxons, the Dutch, and the Swiss, being however decidedly the most saving without stinting themselves in their comforts, or failing in general respectability. With regard to the English, I may say that educated workmen are the only ones who save money out of their very large wages.”

My second illustration of this point is taken from the New England States. In the year 1841, the Honorable HORACE MANN, late Secretary of the Massachusetts Board of Education, made a most laborious inquiry into the comparative productiveness of the labour of educated and uneducated manufacturing operatives in that State. The substance of the answers of manufacturers and business men to whom he applied, is stated by Mr. MANN, in his fifth Educational Report, in the following words:—

“The result of the investigation is the most astonishing superiority in productive power on the part of the educated over the uneducated labourer. The hand is found to be another hand when guided by an intelligent mind. Processes are performed not only more rapidly, but better, when faculties which have been cultivated in early life furnish their assistance. Individuals, who without the aid of knowledge, would have been condemned to perpetual inferiority of condition and subjected to all the evils of want and poverty, rise to competence and independence by the uplifting power of education. In great establishments, and among large bodies of labouring men, where all services are rated according to their pecuniary value, there it is found as an almost invariable fact, other things being equal, that those who have been blessed with a good Common School Education, rise to a higher and higher point in the kinds of labour performed, and also in the rate of wages paid, while the ignorant sink like dregs to the bottom.”

In his Report for 1847, (which I received a few weeks since,) Mr. MANN reverts to the same subject in the following impressive language:—

“In my fifth Annual Report, I presented the testimony of some of the most eminent and successful business men amongst us, proving from business data, and beyond controversy, that labour becomes more profitable as the labourer is more intelligent; and that the true point of wealth,

the veritable coinage of the country, is not to be found in magnificent government establishments, at Philadelphia or New Orleans, but in the humble schoolhouse.

"On the occasion referred to, one of our most sagacious manufacturers declared, not only in accordance with the conclusions of his own reason, but as the result of an actual experiment, that the best cotton mill in New England, if worked by operatives so low in the scale of intelligence as to be unable to read and write, would never yield the proprietor a profit;—that the machinery would be soon worn out, the owner impoverished, and the operatives themselves left penniless. Another witness, for a long time superintendent of many work people, made the following striking remark: 'So confident am I, that production is affected by the intellectual and moral condition of help, that, whenever a mill or room should fail to give the proper amount of work, my first inquiry, after that respecting the condition of the machinery, would be, as to the character of the help: and if the deficiency remained any great length of time, I am sure I should find many who had made their marks upon the pay-roll, being unable to write their names; and I should be greatly disappointed, if I did not find, upon enquiry, a portion of them of irregular habits and suspicious character.'"

Such I believe to be the experience of both Europe and America, as to the comparative value and profit of the labor of educated and uneducated mechanics, even in the humblest position of the manufacturing operative. And if such be the difference between the taught and untaught workman in cases where little more is required than manual skill in performing the appointed task, what must be the magnitude of the difference in this country, where each labouring mechanic is to so great an extent his own superintendent—where the various trades are for the most part carried on by isolated individuals, or in small shops, rather than in large manufactories, and where the success of each mechanic depends more upon intelligent enterprise than upon mere operative skill? As each agriculturist in Canada should unite in himself the intelligence of the English overseer and the practical skill of the farm laborer; so should each Canadian mechanic combine in his own person the qualifications and skill of the European manufacturing superintendent and operative.

But the advantage of scientific knowledge to the mechanic must appear from the very nature of his employment, apart from the considerations of the accomplishments and pleasures of learning. To instance a few trades that are already practised in this City and Province, and that are extending every year: In the manufacture of the steam engine, for example, (and the same remarks are applicable to the manufacture of other kinds of machinery,) is it not of practical use to the mechanic to know the principles upon which that engine is constructed—to know so much of the science of mechanics as will enable him to understand the reasons of the various mechanical contrivances which his engine exhibits—to know so much of Chemistry as may acquaint him with the nature and properties of steam, of refrigeration and expansion, of the effects of heat and cold; rather than proceeding by rote, as a mechanical imitator, to construct the various parts of the wonderful machine, to put up the cylinder, fit the piston to its place, adjust the parallel motion and adapt the several rods and wheels, the weights and valves, without any knowledge of the principles on which any part of the machinery is framed or put in motion, or how a small quantity of water is converted into an instrument of immense power in the service of man, for driving all kinds of machinery, for propelling ships across the oceans, and carriages over continents? Nor can it be otherwise than advantageous to the coachmaker to understand the principles which determine the proper line of draught, the advantage and disadvantage of the several sorts of springs, and the size and construction of the axles and wheels; while the architect and engineer, the ship-builder and carpenter, the mason and bricklayer, the millwright and machinist, cannot fail to be essentially benefited by a knowledge of the principles of *mechanics* and *dynamics*, and the departments of *hydrostatics* and *hydraulic*, of *electricity* and *pneumatics*, as well as of the elements of the mathematical sciences. Not to enter into details on a point so obvious, I may remark in the words of an acute practical philosopher—

"To how many kinds of workmen must a knowledge of mechanical philosophy be useful? To how many others does chemistry prove almost necessary? Every one must perceive at a glance, that to engineers, watchmakers, instrument-makers, bleachers and dyers, those sciences are most useful, if not necessary. But carpenters and masons are surely likely to do their work better for knowing how to measure, which practical mathematics teaches them, and how to estimate the strength of timber, of walls, and of arches, which they learn from practical mechanics; and they who work in various metals are certain

to be more skilful in their trades for knowing the nature of these substances, and their relations to both heat and other metals, and to the airs and liquids with which they come in contact. Nor is it enough to say, that philosophers may discover all that is wanted and may invent practical methods, which it is sufficient for the working man to learn by rote, without knowing the principles. He never can work so well if he is ignorant of the principles; and for a plain reason: if he only learns his lesson by rote, the least change of circumstances puts him out. Be the method ever so general, cases will always arise in which it must be varied in order to apply; and if the workman only knows the rule without knowing the reason, he must be at fault the moment he is required to make a new application of it."

And if an appropriate and comprehensive preparatory education contributes to the material interests of the mechanic, will it add less to his *intellectual and social enjoyment*?

Absence of knowledge is absence of the essential condition and materials for rational enjoyment. There is a pleasure—a great pleasure—in the very consciousness of power which knowledge bestows, as well as in the sensible elevation of mind which it imparts, and the emotions and exercises which it awakens. How different are the pleasures of the mere creature of corporeal senses, of sensitive appetites and passions, from a being of developed mental faculties and intellectual tastes and enjoyments? How different is the state of mind connected with the exertion of one's physical powers from the necessity of subsistence and the promptings of intelligence? How different are the enjoyments of the man who knows nothing of the world or its inhabitants beyond the limits of his own horizon, from those of the man whose intellectual eye can travel to other lands and to other ages—can survey the varied aspects of the entire globe—the oceans and rivers, the continents and islands which indent and diversify its surface—the animated beings that people them, and that float in the atmosphere which envelops them—the revolutions of empires, and the history of the human race? How different the enjoyments of the untutored mind which looks up to the firmament as the roof of his earthly dwelling, and the stars as taper lights suspended to glimmer upon the path of the nocturnal traveller, from those of the enlightened mind that sees in the magnificent orbs of heaven so many worlds and suns, that contemplates their magnitudes, their distances, their motions, and the sublime purposes of their creation! How different are the feelings connected with the rote labour of the workman who plods through his task without knowing any more of the reasons of a single step of the process adopted, or of any part of the work executed, than the ox which draws the plough knows of the science of tillage, from those feelings connected with the intelligent labour of the educated workman who understands the philosophy of every process required, and the principles involved in each piece of machinery constructed, from the separation of the cotton seed and the carding of the wool to the printing of the calico and the finishing of the broadcloth, from the felling of the timber to the erection of a palace—from the smelting of the ore to the making of a watch or the construction of a steam engine! And must it not impart a noble and unspeakable pleasure to a mechanic to trace to a few elementary principles and substances all the operations of mechanism, and all the materials on which he is depending in the exercise of his trade; and to contemplate the analogy between the most simple facts that come under his every day observation and various beautiful and sublime phenomena of nature—to be able to reduce the innumerable combinations and modifications of forces which are often so astonishing and which are so indefinitely varied in all descriptions of machinery, to six mechanical powers, regulated by ascertained and immutable laws—to find the endless productions of the vegetable and animal kingdoms consisting of scarcely half-a-dozen simple substances, and some of these invisible gases—to know that the same principle which causes sparks to be emitted by the rubbing of a cat's back, produces the beautiful coruscations of the aurora borealis, the lightnings of heaven, and the sublime phenomena of the thunder storm—to realize the identity between the principle of gravitation which endangers his own safety in the event of his losing his centre of gravity in an elevated position, and that principle which forms the mechanical powers, which gives solid foundations to the mountains, which determines the march of the river, the rush of the cataract, and the boundaries of the ocean, which directs the planets in their

orbits, and regulates the movements of the worlds and suns and systems that people the universe.

Now such knowledge is eminently calculated to produce that activity of mind which is one of the essential conditions of individual happiness, and presents those objects which are happily adapted to gratify the taste, to please the imagination, to enrich the understanding, to elevate and strengthen the moral feelings. A mechanic possessed in his own person of such materials and resources of enjoyment, will not be likely to sink down into melancholy slothfulness, or resort to places of sensual and intemperate indulgence for relaxation and pleasure. The study of the Chemistry and Mechanics of Nature, which contributes so largely to qualify the artizan for his trade, leads him to the great Architect of the Universe whose works he is investigating, and by whom he himself is fearfully and wonderfully made. In his acquaintance with the geography of the globe and the history of its inhabitants, he will find vivid and affecting illustrations of those Biblical truths which have formed an essential part of his early education. Obedient to such lessons of practical instruction, his moral feelings will harmonize with the conceptions of his enlarged understanding; and while a well-spring of happiness is thus created in his own bosom, he will be qualified not only to participate, but increase the enjoyments of social intercourse with his fellow-men.

2. But secondly, the proper education of the mechanic is important to the *interests of society* as well as to his own welfare and enjoyment.

1. An educated mechanic may render important service to society by his *intelligence* and *influence*. If ignorance is paralyzing and selfish, sound knowledge is enlivening and diffusive. The mechanic's knowledge gives him power with his fellow-citizens, and is of that practical character which is best adapted to promote their common interests. Every such educated member of a community, who makes a proper use of his knowledge, is an *enlightened man*—a radiating centre—throwing off beams of intelligence and moral influence in every direction. If mutual dependence and influence is the law of the material universe, it is pre-eminently so of the world of mind. Our membership of the common family of mind, apart from positive institutes, divine and human, makes us "every one members one of another;" and the links of the chain which thus connects us together, are the electrical conductors of an intellectual and moral influence to every member of the social circle. The influence which a well-instructed mind—especially among the labouring classes—may send forth into the community, is beyond the arithmetic of human calculation; and the intellectual and moral power with which the knowledge I have above indicated invests the mechanic, possesses amazing advantages over the mechanical forces which he has been accustomed to employ in the pursuit of his trade. By the immutable laws of matter, mechanical forces are enfeebled and ultimately exhausted by action, and can only be maintained in their intensity by constant resort to the source of their power; while the force exerted by mind acquires increased strength by exercise, and awakens in mind after mind its own sympathetic and self-propagating energy, unlimited either by space or duration. Thus the ideas, the sentiments, the feelings of one man, may become those of his family, of his neighbourhood, of his country, of succeeding generations; and what may appear at first but a feeble impulse, reflected from mind to mind, as the faintest accents vibrate along the walls of a vast whispering gallery, will acquire increased power in its progress, until its influence imparts character to the most distant portions of society, and its voice gives law to the remotest ages of mankind.

But if we limit the educated mechanic's influence to the neighbourhood or city of his own personal residence, and to the circle of his own personal association; there is not an interest of that neighbourhood or city which his practical knowledge will not enable him to advance—there is not a rational pleasure of that society which his general intelligence will not enable him to promote. And in the case of the mechanic who acquires affluence by his industry and enterprise and retires from active business, while the absence of education and knowledge makes his leisure days a blank, if not an occasion of restless peevishness or animal indulgence, the possession of such intellectual treasures will indefinitely multiply the value of his material wealth, and make his last days doubly happy

to himself, doubly useful to his family, and doubly beneficial to society.

2. I remark, secondly, that an educated mechanic may essentially advance the interests of society, by *discoveries, inventions* and *improvements in the practical arts*. This is what ignorance has never done, and what it cannot do. It is true that discoveries and inventions of the greatest importance to mankind have been made by men who had not received an university, nor indeed much early education of any kind. But by their indomitable perseverance and powerful native genius, they supplied in later years the deficiencies of their early years. Their discoveries and inventions were not the result of ignorance, but the fruits of knowledge pursued under difficulties. Count RUMFORD was a farmer's son in Massachusetts, and he never enjoyed the advantages of a Collegiate education; but he never would have become so eminent a philosopher, much less the principal founder of the Royal Institution of Great Britain,* had he contented himself with the knowledge of the farm,—had he not walked down to Harvard University to hear lectures on natural philosophy, and, in after years, pursued his investigations and experiments with indefatigable industry. ARKWRIGHT was also a barber's son, and the youngest of thirteen children, and himself a travelling barber until he was thirty years of age; but had he not long witnessed the spinning-wheel operations of the Lancashire peasantry, he would not have conceived the idea of an improved spinning machine; nor is it likely that he could have executed his own conception without the skill and co-operation of an intelligent clockmaker, to whom he applied, and with whom he formed a partnership. So likewise was FRANKLIN a journeyman Printer; and he might have remained so for life, had he not attended the lectures and witnessed the electrical experiments of a Dr. SPENCE, a Scotch Lecturer in Boston, and purchased Dr. SPENCE's philosophical apparatus, repeated his experiments in Philadelphia, and continued, with additional facilities, to pursue the researches and enlarge the boundaries of electrical science, until he reached the discovery which has made him the benefactor and admiration of mankind.

Nor is there reason to believe that WATT, the Mathematical Instrument Maker to the Glasgow University, would have ever conceived his improvements in the use and application of steam and the construction of the steam engine, had he not been from his youth devoted to mathematical studies, and had he not learned from the lectures of Dr. BLACK, the theory of *latent heat*, and had he not persevered for years in his philosophical and mechanical experiments until he produced the most important of all modern inventions.

I will not multiply examples, scores of which are doubtless as well known to many of you as myself. These are sufficient to show that it is to *scientific knowledge*, whether self-taught or school-taught, and not to illiterate skill, that we are indebted for the most important discoveries and inventions in the practical arts and sciences. It was not COLUMBUS the Genoese coasting sailor of the Mediterranean, but COLUMBUS the indefatigable sailor student, the most accomplished Geographer and Philosopher of his age, who, having demonstrated from the rotundity of the earth the possibility of reaching Eastern Asia by sailing a due West course, discovered America in his voyage, and thus originated to mankind the untold blessings which have resulted, and which may yet result, from that discovery. It was not FERGUSON the shepherd boy, that made the valuable contributions to astronomical and mechanical science; it was FERGUSON the laborious philosophical student of forty years, that numbered royalty among his auditors and the patrons of his works on experimental philosophy. Similar remarks may be made in respect to many others who have added to the domains of practical science and to the comforts of common life by their discoveries and inventions. Almost every improvement in the arts is a contribution of science—a scientific accession to the power of mind over matter—a fresh impulse to the vital principle of modern civilized society—an improvement in some part of that grand instrument of mechanical science by which man makes the great storehouse of nature minister to his wants, tastes and pleasures,—an additional

* This Institution was founded in the year 1800, "for diffusing the knowledge and facilitating the general introduction of useful mechanical inventions and improvements, and for teaching, by courses of philosophical lectures and improvements, the application of science to the common purposes of life."

link to that chain of practical knowledge which is every day binding different classes of society and even nations and continents into a closer intimacy of mutual dependence and friendship.

The object of these remarks is to guard against a two-fold error: The one is, that no scientific knowledge is to be attained except in the curriculum of a university; the other is, that science has nothing to do with improvements in the arts; but that accident, or a single freak of native genius, is the parent of all these inventions and improvements in the mechanic arts. The presumption created by the fact, that these inventions and improvements have followed the revival and enlargement of the natural sciences, is confirmed by their history, and refutes both the errors to which I have alluded. That history tells the Canadian mechanic, that he is not to be deterred from attempting to master, if not to improve the whole science of his trade because he has not enjoyed the advantages of a University, or even a good Common School education; while it clearly indicates to him on the other hand, that as every department of mechanism is the application of certain laws and principles of nature, he need not hope thoroughly to understand, much less to improve any branch of his own trade, any further than he acquaints himself with those principles and laws.

Very few of those who have distinguished themselves as the authors of discoveries, inventions, and improvements in mechanical science, have enjoyed greater advantages of leisure and resources, than can be commanded by the majority of mechanics in Upper Canada; and yet what unspeakable benefits have those humble men conferred upon the human race! To select only a few illustrations: Who can conceive the political and social revolutions which have already resulted from the European discoverer of the magnetic needle,—that sleepless, unerring, faithful little pilot, unblinded by the starless midnight, and unmoved by the raging tempest,—which at once relieved the mariner from his timid creeping from headland to headland, and among its first feats opened the commerce of India, and guided COLUMBUS to the discovery of a new world—the most important event in the history of modern nations and of modern civilization. What mind can imagine the results to mankind, in every department of science and knowledge, in every aspect of civilization, and in every interest of civil freedom and social advancement, which emanated from the humble inventor of the Art of Printing,—an art which seems to be but in the mid career of its improvements, and whose magic power appears destined at no remote period to penetrate yet unexplored regions of humanity and to transform the institutions and society of every uncivilized nation of the globe. The cotton manufacture of Great Britain may almost be said to date its commencement, as a branch of national industry and commerce, with ARKWRIGHT'S invention in spinning machinery, soon followed, as it was, by CARTWRIGHT'S invention of the power-loom; which however was not extensively introduced until the commencement of the present century. Before ARKWRIGHT'S invention, the East Indies were superior to Europe, and exhausted its riches by their manufacturing products. "Now," as the eloquent DUPIN says, "the British navigator travels in quest of the cotton of India—brings it from a distance of four thousand leagues and commits it to an operation of the machine of ARKWRIGHT and of those that are attached to it—carries back their products to the East, making them again to travel four thousand leagues;—and in spite of the loss of time, in spite of the enormous expense incurred by this voyage of eight thousand leagues, the cotton manufactured by the machinery of England, becomes less costly than the cotton of India, spun and woven by hand near the field that produced it, and sold at the nearest market." Before ARKWRIGHT'S invention, the whole annual amount of the cotton manufacture of Great Britain did not exceed £200,000; now it amounts to forty millions of pounds per annum! Then the raw cotton manufactured amounted to about four millions of pounds per annum; it now exceeds two hundred millions! Aided by this machinery, one person can now perform the work of two hundred and sixty-six persons before its invention.* And if ARKWRIGHT'S spinning-machinery

invention has added to the manufacturing industry of Great Britain what is equal to the labour of forty millions of human beings—twice the entire population—WATT'S invention and improvements in the steam-engine, in its application to the manufactures alone, adds the power of more than one million of men, and in connexion with other machinery, performs an amount of labour, according to Dr. BUCKLAND'S estimate, "equivalent to that of three or four hundred millions of men by direct labour," besides its achievements on the continent of Europe and in the United States, in almost every branch of mechanical and manufacturing industry—and besides its navigation of the rivers and oceans and seas of the whole globe—thus changing the social condition of man. Take another illustration in the bleaching of linens and cottons. Formerly this was a process of six or eight months duration; and so little was it understood in Great Britain, that nearly all the British manufactured linens and cottons were sent to Holland, and bleached upon the fields around Haarlem. But by the application of chlorine, the property of which to destroy vegetable colours was discovered by a Swedish philosopher in 1774, the process of several months is reduced to that of a few hours; and it is said, "that a bleacher in Lancashire received fourteen hundred pieces of grey muslin on Tuesday, which were returned bleached, on the second day after, to the manufacturer, at a distance of sixteen miles, to be packed and sent off that very day to a foreign market."

And what advantages have accrued to mankind from FRANKLIN'S brilliant discovery of the identity of the lightning of the clouds, and the electricity produced by a piece of silk-rubbed sealing wax—in consequence of which the thunder cloud is rendered harmless; and this very electricity is now employed as the medium of thought, with the rapidity of thought, between distant cities and countries. As late as 1789, a hope was expressed by the Southern members of the American Congress, that cotton might be grown in the Southern States, provided good seed could be procured. Shortly after, a Connecticut mechanic by the name of WHITNEY, invented the Cotton-gin, for separating the seed from the fibre—an invention which has trebled the value of all cotton-growing lands in the Southern States, while it has given birth to a most important branch of American commerce and manufacture.* How many thousands of lives have been saved by the safety-lamp of Sir HUMPHRY DAVY; and how much are our comforts increased and our interests advanced by the discovery of carburetted hydrogen gas, by which common coal is made the brilliant illuminator of our streets, and shops, and dwellings.

The humble author of any one of these discoveries or inventions, has established infinitely stronger claims to the grateful admiration of mankind, than an ALEXANDER or NAPOLEON; and each discovery or invention is directly or indirectly a contribution of science to the arts and comforts of civilized life—for the most part of science long and diligently pursued under great privations and difficulties.

I know not that I can so well conclude these brief illustrations of this part of my subject, as in the authoritative words of two distinguished and patriotic educationists—a philanthropic American, and a philanthropic English nobleman—the Honorable HORACE MANN, and the Right Honorable LORD MAHON. Mr. MANN, in a speech lately delivered in Congress, against the extension of slavery, after having shown that slavery destroys common education, and then the fruits of education—the inventive mind, practical talent, the power of adapting means to ends in the business of life,—eloquently proceeds as follows:—

"Whence have come all those mechanical and scientific improvements and inventions which have enriched the world with so many comforts, and adorned it with so many beauties; which to-day give enjoyments and luxuries to a common family, that neither Queen ELIZABETH, nor any of her court ever dreamed of, but a little more than two centuries ago?"

of the reign of Charles the Second, a great part of the iron which was used in the country was imported from abroad; and the whole quantity cast here annually seems not to have exceeded ten thousand tons. At present the trade is thought to be in a depressed state if less than eight hundred thousand tons are produced in a year." Vol. I., pp. 295, 296.

* Dr. JAMES RENWICK, of New-York, in his *Practical Mechanics*, published in 1840, says—"The quantity of cotton manufactured in the United States is now as great as was consumed in Great Britain in 1814; the Southern planters have found a new market equal to one-fourth of their whole crop, and the Northern wheat-growers receive a price for their product not graduated by the cost of production, but by that of importation from foreign countries." Page 284.

* Two centuries since, the tinners of Cornwall threw away the ores of copper, as refuse, under the name of *poder*; now, says Mr. MACAULEY, in his new History of England, "Cornwall and Wales at present yield annually near fifteen thousand tons of copper, worth near a million and a-half sterling, that is to say, worth about twice as much as the annual produce of all English mines of all descriptions in the seventeenth century." "At the close

Among whom have these improvements originated? All history and experience affirm that they have come, and must come, from people among whom education is most generous and unconfined. Increase the constituency, if I may so speak, of developed intellect, and you increase in an equal ratio the chances of inventive, creative genius. From what part of our own country has come the application of steam to the propulsion of boats for commercial purposes or of wheels for manufacturing purposes? Where have the various and almost infinite improvements been made, which have resulted in the present perfection of cotton and woollen machinery? Whence came the invention of the cotton-gin, and the improvements in railroads? Where was born the mighty genius who invented the first lightning-rod, which sends the electric fluid harmless into the earth; or that other genius, not less beneficent, who invented the second lightning-rod, which sends the same fluid from city to city on messages of business or affection? These are results which you can no more have without education, without imbuing the public mind with the elements of knowledge, than you can have corn without planting, or harvests without sunshine."

Lord MAHON, in an address at the Annual Soiree of the Manchester Athenæum, the 16th November, as reported in a paper received by me at the beginning of the present week, expresses himself in the following emphatic language:—

"If you look around you, if you see the greatness and importance which Manchester has attained, and if you consider within how limited a period, that attainment has been achieved, you cannot I am sure forget that this greatness and this importance are mainly owing to the discoveries of modern science. Consider what rapid advances these discoveries in science have enabled you to make. Little more than a century ago, the young Pretender marched through your town, and lodged at a house standing not many years since in Market Street; I ask you, if it were possible for him to revisit these scenes, do you think he would recognize them again? Do you think he would see any resemblance between the not considerable country town, as this then was, which he so easily marched through, and what it has now become, —this immense capital of our manufacturing enterprise, this vast mart of active wealth, this swarming hive of busy industry? What would he have said to those lines of factories which have arisen on every side, affording honorable employment to hundreds of thousands of our people, and the beneficial effects of whose produce have been felt in the remotest corners of the globe? When I see, then, so much progress made, and know that this progress is due to science—when the discoveries of science form, in fact, the chronicles and annals of your city—can I doubt for a moment that the study of science requires no words of mine to call forth encouragement from you—that you will be desirous to explore the root of your own greatness, the ground work of your own importance?"

It is now time for us to turn to our own country—to some of us our adopted, to others our native land—to all, our home, and the home of our children. I regret that I cannot refer to the history of Upper Canada as an illustration of the triumphs of mechanical science—as an example of its skilful application in every branch of public and manufacturing improvement. As with all the faults of Upper Canada we love her still, and with all the drawbacks upon her social advancement we still admire her energetic progress; we can scarcely turn to a page of her past history without finding melancholy evidence of the want of scientific knowledge in the management and development of her resources. If we look at the vast sums of money which have been borrowed and laid out on our roads and bridges, what have they all amounted to, with a few recent exceptions, but almost absolute losses, for want of the requisite knowledge and skill on the part of managers and engineers? What immense sums of public money have been wasted in the construction of various of our provincial works, from the same causes? How many private individuals in every District in Upper Canada have been reduced to bankruptcy from the same kind of mechanical incompetency? How many enterprising persons have expended their all in the erection of mills and other kinds of machinery, and have at length found their efforts fruitless and themselves ruined on account of the ignorance of the mechanics on whose supposed knowledge and judgment they relied to execute their plans. We have monumental proofs of this in the broken mill-dams, the decaying mill-frames, and the dilapidated manufacturing buildings which meet us in every part of the Province. The larger portion of these engineer and mechanical pretenders have been foreign adventurers. They came here not to improve Canada, but to make money, and then return whence they came. Native skill has had very little part in the public works of our country—native skill has, for the most part, remained alike unemployed and undeveloped. Had the early Government of Canada commenced

the establishment of Scientific Schools for Canadian engineers and artisans, at the time, and with a liberality corresponding to that which it displayed in establishing Greek and Latin Grammar Schools, how different would have been the career of our public and private improvements? Had one-tenth part of the money been expended in the proper education of Canadian mechanics which has been lost to Canada in consequence of mechanical ignorance, we might have had a school for mechanics, amply provided with apparatus, libraries and able Teachers and Lecturers, free to all applicants, in every District Town in Upper Canada—tens of thousands of pounds would have been saved to our public debt, and like sums would have been added to the productiveness of our public works.

The remaining practical question then is—is the past to be the emblem and type of the future? Is adventurous foreign mechanism to do our work? or avaricious foreign ignorance and cupidity to waste or absorb our resources? Is the Canadian mechanic or engineer to occupy a position of inferiority beside the European or American engineer or mechanic? Let me not be misunderstood. By the Canadian mechanic, I mean the Canadian resident, whatever may have been the country of his birth or education. I hold that the moment a man, placing his foot on Canadian ground, says this is my home and the home of my offspring, ceases to be a Scotchman, an Irishman, an Englishman, or American, or even a Frenchman or German, and becomes a Canadian, and should think and feel and act in reference to his local residence and relations. To immigrant mechanics and manufacturers, both from the mother country and the United States, I think Upper Canada is largely indebted for the little mechanical and manufacturing improvements she does possess; while presuming foreign adventurers, speculating upon the simplicity of domestic ignorance, have inflicted upon our country untold injuries and losses. That domestic ignorance in respect to mechanical science and arts ought never to have existed.* It was, to say the least, an inverted pyramid policy which provided for a preliminary education for the professions, and a magnificent endowment for University education, without making any provision for a corresponding preliminary education for the trades, or a penny's endowment for the common education of the people. Is this policy to be perpetuated? Are the productions of the trades to constitute a most considerable branch of the public revenue, and yet no provision to be made for the education of those trades? What are the mechanic arts of a country, but the very arteries and tissue of its prosperity and civilization? Not an acre could be tilled, or a bushel of grain floured, or a cottage erected, or a table spread, or a garment worn, without the fruits of mechanical industry, and, in several respects, of scientific mechanical invention. Without her mechanical arts—nay even without her coal mines, and the skill to work them—Great Britain herself would be one of the poorest countries of Europe, instead of standing at the head of human power and civilization. What would the Eastern and Northern parts of the neighbouring States be, but for their manufactures and mechanical inventions and machinery? The resources of Western Europe were drained as long as she depended upon Asia for her manufactures; and so will the resources of Canada be drained, and the country remain stationary, as long as it sends off its money to buy from abroad what it can manufacture at home. Every shilling of money sent out of the country, reduces its available capital; every article of produce or manufacture, exported from the country,

* I think it proper to remark here, that the Canadian government was not peculiar in this course of mistaken policy. Out of Germany, no government of Europe seems to have thought of providing schools of arts and trades until since the general peace of 1815; nor was any provision of the kind made by the Legislatures in the neighboring States until recently; but the admirable English High Schools in their principal cities and towns, and the facilities and practical character of special courses of instruction furnished in their Colleges and numerous Academies, have, to a great extent, supplied the wants now provided for in Europe by schools of arts and trades. Indeed, viewing public instruction in connexion with the education of the entire population of a country, is a modern innovation upon old notions and systems of government. The single fact, that splendid endowments were created for the Universities, which educate the comparatively wealthy and few, while the Common Schools, which educate the comparatively needy and many, were left to the chances of casual grants, illustrates the real character of the old systems of government. The sentiment which begins to obtain, and which I wish to see universal, is to retain the provision for University Education unimpaired, but provide with equal liberality and in proportion to wants and numbers for the education of the commercial, mechanical, and labouring classes of the community. It remains to remedy, as far as possible, the evils of the past, by the greater care and exertions of the future.

increases its wealth. In a country of wood, why should we import any articles of wooden manufacture? In a country of iron mines, why should not the shelves of our hardware merchants be furnished with Canadian hardware? In a country of sheep and flax, why should we not be supplied with Canadian woollens and linens? And why should we not import the raw-cotton, and manufacture it ourselves, as well as import the manufactured cotton? Why should not home skill and industry supply home wants, and thus build up every description of home interests, and indefinitely advance home prosperity and wealth?

The rapid growth and prosperity of the neighbouring States commenced and has advanced with the establishment and extension of their manufactures and mechanical improvements. Though large public expenditures have been incurred in Upper Canada, we have scarcely commenced the career of internal improvement and national greatness. The facilities of our internal communications, both by land and water, are hardly begun; and but the commencement of a beginning has been made to develop the vast and yet unknown mineral treasures and manufacturing resources of our country. If the employment of machinery has added to the productive industry of Great Britain the power of three or four hundred millions of men, why may not the use of the same kind of means add to the productive industry of Upper Canada the power of ten or twenty millions of men? And is not this a safe, and profitable, and gigantic system of immigration, remote from the squalidness of poverty or the infection of disease? But such power cannot be introduced without scientific mechanical skill to create and employ it; and such skill cannot be acquired without schools to teach its elementary and general principles. I think you will agree with me in the sentiments of a practical New-Englander—an accomplished scholar, an able diplomatist and governor. The Honourable EDWARD EVERETT, in an admirable Essay on the *Importance of Scientific Knowledge to Practical Men*, recently published, remarks that—

“The elementary knowledge of science, which is communicated at the Colleges, is, indeed, useful in any and every calling; but it does not seem right that none but those intended for the pulpit, the bar, or the profession of medicine, should receive instruction in those principles which regulate the operation of the mechanical powers, and lie at the foundation of complicated machinery; which relate to the navigation of the seas, the smelting and refining of metals, the composition and improvement of soils, the reduction to a uniform whiteness of the vegetable fibre, the mixture and application of colors, the motion and pressure of fluids in large masses, the nature of light and heat, the laws of magnetism, electricity, and galvanism. It would seem that this kind of knowledge was more immediately requisite for those who are to be employed in making or using labour-saving machinery, who are to traverse the ocean, to lay out the construction of canals and railroads, to build steam-engines and hydraulic presses, to work in mines, and to conduct large agricultural and manufacturing establishments.”

Why then have we not Schools to secure to our own country the priceless benefits of such education for its mechanics? And why is not the mechanical population entitled to endowments for such a preparatory education as well as the professional population to University, and College, and Grammar School endowments? In the principal Cities and Towns in Great Britain, Institutions have long been established, mostly however by municipal authority or private liberality and enterprise, where intended architects, and engineers, and mechanics, have acquired the requisite preliminary knowledge for their respective employments. Mechanics' Institutes and kindred associations are doing much, by means of scientific and popular lectures for the instruction and benefit of practical mechanics who have enjoyed few or no educational advantages in early life. Latterly the Government has begun to contribute to the same object, by the establishment of Schools of Arts and Design, which are numerous attended by mechanics of various trades. Even the old, and hitherto immutable universities of Oxford and Cambridge are beginning to imbibe the spirit of progress, and to assimilate their statutes and systems to the demands and wants of the age. In Paris, besides the Polytechnic School of France, or as it was formerly termed, “the Central School of Public Works” (designed to educate young men for the military, naval, and civil service) and its appendages the “School of Roads and Bridges,” and the “School of Mines;” you will find—or at least you might have found a year or two since—the “Central School of Arts and Manufactures”—designed for young men, throughout the nation,

intending to become civil engineers, superintendents of manufactories and workshops, architects and machinists, &c., and embracing a three years course of instruction, and comprehending every department of mechanical science. In 1845 several hundred young men were in attendance at this School, and among them not a few foreigners. Every State of Germany has its trade Schools, as well as its elementary and classical schools. Even in Austria, at Vienna, there exists a Polytechnic Institute on the most extensive scale, as a school of mechanic arts, manufactures, and commerce, and with no charge to students but a trifling entrance fee. In each of the twenty regencies of Prussia, there is a School of Arts, supported at the expense of the State—in all cases the Government also supplying the apparatus for the courses of mechanics, physics, and chemistry, and furnishing the requisite engravings for the courses of drawing, text-books for instruction, and the library.

Is it surprising then, that such parts of Europe excel in skill and taste in the mechanic arts of every description (how deficient soever they may be in the art of free government) when they are dotted over with schools of the arts? This fact has not escaped the notice of our far-seeing American neighbours. Their educationists and philanthropists have called attention to it. They have recently established new departments in some of their Colleges to meet the exigency, while the elements of the natural sciences have long been subjects of instruction in many of their Academies and Common Schools.* In the message of the newly elected Governor, delivered the 2nd of the present month to the Legislature of the State of New-York, I find the following paragraph, a paragraph which speaks to Canadians as well as Americans, and such as I should like to see in the forthcoming vice-regal speech to our own Legislature:—

“I think the time has arrived when the State is called upon to make provision for the advancement of Agricultural science, and of knowledge in the Mechanic arts. Of late years the science of Agriculture has received much attention, and its influence in combination with the practical labors of those engaged in the ennobling pursuits of husbandry, has lessened the toil and increased the returns of the tillers of the soil. Similar influences have produced similar results with respect to the mechanic arts. If the wealth, and power, and independence of a nation, are to be estimated by its ability to supply, from within itself, its most essential wants, and from its abundance to minister to the wants of others, it is both wise and politic for the State to aid the advancement of those particular branches of knowledge, more immediately bearing upon the pursuits of the great producing classes. In this view I cannot too strongly recommend the endowment by the State of an Agricultural School, and a School for instruction in the Mechanic Arts.†”

In conclusion, then, I have only to add, is Upper Canada still to remain indifferent to this vital element of domestic prosperity and social progress? Will not the mechanics of Upper Canada—especially the mechanics of Toronto—adopt some energetic means

* The extent to which American genius and enterprise have been employed in mechanical improvements, may be inferred from the number of patents for inventions and designs issued in the United States. A complete list of these, from 1790 to 1847, has recently been published, and curiously illustrates the genius of the Americans, and the effects of education, slavery, and ignorance, in the different quarters of the Union. The number of patents issued to the citizens of Maine was 483; New-Hampshire, 297; Vermont, 310; Massachusetts, 2151; Rhode Island, 234; Connecticut, 1156; New-York, 3392; New-Jersey, 461; Pennsylvania, 2167; Delaware, 51; Maryland, 660; Virginia, 634; North Carolina, 137; South Carolina, 122; Georgia, 80; Alabama, 65; Mississippi, 23; Louisiana, 77; Tennessee, 108; Kentucky, 185; Ohio, 749; Michigan, 51; Indiana, 114; Illinois, 71; Missouri, 40; Florida, 1; Texas, 1; Iowa, 2; Wisconsin, 8; and District of Columbia, 224. During the same time the following number was granted to the principal Cities: Boston, 623; New-York, 1787; Philadelphia, 916; and Baltimore, 430. New-England States, 4,641; Northern States, 11,606; Southern States, 2,409. Total, 14,015.

† While these pages are passing through the press, we find the following paragraph in a New-York paper:—

“The Bar is no longer the resort of the ambitious youths of our country. The mechanical departments are being preferred: there are now thirty young gentlemen in this city, who have received liberal education, who are serving their ‘times’ as shipwrights, architects, carpenters, &c. In a few years the United States will have the most accomplished mechanicians in the world. A new class is springing up who will put the present race of mechanics in the shade. The union of a substantial education with mechanical skill, will effect this. Indeed already we could name some mechanics who are excellent mathematicians, acquainted with French and German, and able to study the books in those languages connected with their vocations. Heretofore, fond fathers were wont to educate their sons as doctors and lawyers, to insure their respectability and success. That day is passed. Mechanics will take the lead, and in a few years will supply a large portion of the State and Federal Legislature.”

to attain an object so essential to the interests of mechanical industry, and so important to the respectability and pleasures of mechanical pursuits? Why should there not be an endowed Provincial School of Arts in Toronto, as well as an endowed University of Literature? Why should there not be an Elementary School of Arts in every District Town in Upper Canada as well as a District Grammar School? This was one object of the present School Law for Cities and Towns. The official circular transmitting a copy of it to each City and Town Corporation in January last* called their attention to the importance and mode of establishing a Central School in each City and Town adapted to impart a thorough mechanical and commercial education. As no population was ever yet educated, except in crime, *by having its schools shut up*; so mechanics will never attain the educational advantages and social position which are due to arts and manufactures, without asserting the rights of their order, and the hitherto neglected interests of their trades.

And while there is an unmeasured field of improvement and prosperity spread out before us in the landscape of the future, we are not to suppose that there remains nothing for us to achieve in the field of discovery and invention. The steam-engine itself may be but in the infancy of its perfection; the locomotion of the present may be but a snail's speed to the locomotion of the future; and the most admired inventions and machinery of the present age may be thrown aside as useless lumber in comparison of the inventions and machinery of a coming age. The last steampacket from England informs us that Dr. FARADAY has discovered "a hitherto unknown mechanical power connected in a remarkable manner with magnetism;" and apprizes us at the same time, that progressive science, not content with employing the electric fluid as a messenger of thought, has also adopted it as an instrument of light—a light that cheers the deepest gloom for miles in circumference, and which would, in the darkest night, shed the splendour of two full moons over the city of Toronto—a light which seems almost to challenge the solar rays in the brilliancy of its effulgence as well as in the rapidity of its travels. Unknown principles, and elements, and powers, now mysteriously operating around us, may be to our descendents what the mechanical agencies of air and steam are to us; and the past progress in the arts and sciences may be only the introduction to future advancement. May Canada share largely in the honors and benefits of that advancement; and may the generations of future ages rank many of her mechanic sons with the WATTS and ARKWRIGHTS, the FRANKLINS and FULTONS of past ages!

POSTAGE ON THE JOURNAL OF EDUCATION.—It not being known to the Postmaster at Toronto, that the *form* of the *Journal of Education* had been changed so as to subject it to no more than newspaper postage (half-penny each number,) some of the parcels containing the last number were marked at last year's rate of postage—an error which we are assured will not occur again.

ACKNOWLEDGEMENTS—To the 12th February, inclusive.

Rem. for Vol. I, from Supt. Newcastle District (7), Hon. James Ferrier; for Vol. I and II, Hon. Chief Justice Robinson, Rev. F. Pilote, Judge Campbell (Nia. Dis.), Hon. S. B. Harrison, H. Y. Hind, Esq., Hon. Judge Sullivan, G. Duggan, jr., Esq., J. R. Armstrong, Esq., G. B. Spencer, Esq., Supt. Niagara District (5), A. McCleghlan, Esq.; for Vol. II, F. Neale, Esq., A. M., B. Woods, W. H. Wells, Esq., A. M., (Newburyport, Mass.), Supt. C. S. Bytown, J. Corwin, W. Watson, J. Upper, Miss E. Corwin, W. Ramsay, M. McPherson, Rev. T. Cosford, Rev. L. Taylor, Supt. London District, Supt. Johnstown District (for 205 copies), Clerk P. Edw. District (for 104 copies), Clerk Dalhousie District (for 16 M. Cs.), M. L. S. Raymond, Supt. Ottawa District (5), W. Hunter, H. Kropp, W. Meston, J. Paul; Miss Towler, Miss Orr; J. Stewart, F. McNab, J. McKinnon, G. Henry, H. Bowslough, A. Nash, W. Plant, S. B. Buckland, J. Elliott, J. Humphreys, O. Olmstead, J. Diamond, W. L. Hutton, J. W. C. Browne, T. Robinson, J. Price, J. T. Penneck, B. Galloway, A. Campbell, D. Reesor, W. R. Graham, Esq., Mr. Higgins, J. Dall, T. Topping, J. Hawkins, J. Willson, Esq., A. S. Holmes, Esq. (3), A. Morse, Esq., Rev. W. H. Poole (5), L. Lewis, Esq.

JOURNAL OF EDUCATION.

TORONTO, FEBRUARY, 1849.

JOURNAL OF EDUCATION.—On the last page we have inserted such opinions of the Canadian press—French as well as English—as have come under our notice, respecting the *Journal of Education*. We hope the considerable pecuniary loss incurred in publishing the first volume, (besides the gratuitous labour of editing it,) may not be required again in the publication of the present volume. We hope all friends of Education will aid us by their subscriptions in a work objected to by none, and commended by the Canadian Press generally as adapted to promote the educational interests of the Country. In the Annual School Report for the State of New-York, presented last month to the Legislature by the State Superintendent, we find the following paragraph: "The Superintendent would earnestly recommend to the Legislature the continuance of the appropriation of \$2,400 to the *District School Journal*." We ask for no such "appropriation" to sustain the *Journal of Education*; but we should like to see it ordered for all the Legislators and Clergy of Canada, in addition to the subscriptions of Municipal Councils, Trustees, Teachers, &c.

SCHOOL ARCHITECTURE.—The attention of Trustees, Teachers, and all persons interested in the erection of School-houses, is earnestly recommended to the article under the head of *School Architecture*, the second part of which will be continued in the next number. This admirable document was not only printed and furnished to each School Section by order of the Legislature of Rhode Island, but the Superintendent of Schools for the State of New-York recommends the New-York Legislature to furnish every School Section in that State with a copy of it. We have thought that such an Essay on *School Architecture—the Errors to be avoided, and the General Principles to be observed*—ought to precede the various plans of school-houses which will be given in subsequent numbers.

MECHANICS AND MANUFACTURES.—We devote the greater part of this number to one subject—a subject which has not hitherto been more than alluded to in our pages—but a subject more than any other interwoven with every material interest of our country—the source of its wealth, the life of its prosperity, the mainspring in the machinery of its progressive civilization and greatness. We refer to the development of the various natural and mechanical agencies involved in the trades and manufactures of Upper Canada, as promoted by the appropriate education of the mechanical and manufacturing classes of the population. The subject is one of the deepest interest to the statesman, the economist, the philanthropist and the agriculturist, as well as the mechanic and manufacturer. The early publication of the address on this subject, which we insert in the present number, was desired on the part of several intelligent mechanics and manufacturers before whom it was delivered; and we have felt that due regard to the great objects which it was designed to promote, required its publication *entire* in one number—the course we pursued in publishing the Lectures on Education in connexion with *Agriculture and Civil Government*.

The attention of the Legislature has been called to this subject by a Petition from the Mechanics and Tradesmen of Toronto; and we hope the Session will not close without something being done to promote so vital an interest of the country as that of educating

* See *Journal of Education*, Vol. I, pp. 16-21.

its own manufacturers, engineers, mechanics, artists, and artisans, as well as its own scholars and agriculturists.

Mr. HIND, the able Mathematical Master and Lecturer in Chemistry and Natural Philosophy in the Normal School, has favoured us with a communication on this subject, and a Synopsis of the Course of Instruction proper for a Provincial School of Practical Knowledge, or a School of Art and Design. These papers will be inserted in our next number.

THE SCHOOL RATE-BILL SYSTEM IN THE STATE OF NEW-YORK.

—It is known to the readers of the first volume of this *Journal*, that the defects most complained of in our own School Rate-bill system, were occasioned by the loss in the Legislature of certain clauses which were introduced in the original Draft of the present Common School Act. But it will be seen from the account copied into this number, page 26, of the working of the School rate-bill system in the State of New-York, given by the State Superintendent in his Report laid before the Legislature last month, that the Canadian School rate-bill system, with all its defects, is much more simple and advantageous for both Trustees and Teachers than that which exists in the State of New-York. We are glad to find that the New-York State Superintendent is prompted by his long experience and observation to urge upon the Legislature the same remedy for the evils of the Rate-bill system which was recommended by the Superintendent of Schools for Upper Canada, in March, 1846,* in his first official communication on the subject of our School law—namely, the system of *Free Schools*.

SYSTEM OF FREE SCHOOLS.—We beg to recommend attention to the article, page 27, on this subject, which we have extracted from the Annual Report of the Superintendent of Common Schools for the State of New-York, laid before the Legislature, January 1849, and a copy of which we have received since the publication of the last number of this *Journal*. It cannot but appear singular to every reader, that a majority of the Corporation of Toronto should shut up the Common Schools under a system which has been voluntarily adopted by the Citizens of the principal Cities and Towns in the neighbouring States. Whether the policy of shutting up the Schools against all, or that of opening them to all, has been dictated by more intelligence and patriotism, may be decided by every reader.

Our space does not permit us to do any more in this number than acknowledge the receipt of the following Documents and Publications:—

1. *Renewed Remarks on the State of Education in the Province of Canada*, by "L." Montreal, J. C. Becket. pp. 48.
2. *The Student, a Family Magazine and Monthly School-Reader*. New-York, J. S. Denman. pp. 48.
3. *Annual Report of the Regents of the University of the State of New-York*. Albany, 1848. pp. 311.
4. *Annual Report of the Regents of the University on the Condition of the State Cabinet of Natural History; with Catalogues of the same*. Albany, 1848. pp. 90.
5. *Annual Report of the Trustees of the State Library*. Albany, 1847. pp. 95.
6. *Annual Report of the Superintendent of Common Schools, State of New-York*. Albany, 1849. pp. 143.
7. *Annual Report of the Executive Committee of the State Normal School, Albany*. Albany, 1849. pp. 24.

8. *English Journal of Education*—(a monthly publication.)—G. Bell, London, 1848–9. 2 Nos. each, pp. 44.
9. *Journal of the Proceedings of the Municipal Council of the District of Gore*. Special and October Sessions, 1848. pp. 131.

EVILS OF THE SCHOOL RATE-BILL SYSTEM IN THE STATE OF NEW YORK.

[From the Annual School Report of the State Superintendent, laid before the Legislature, 2nd January, 1849.]

The mode of supporting a school, under the present system, is as follows:—

The trustees employ a qualified teacher, for stipulated wages. At the close of his term they gave him an order upon the town superintendent, for such portion of the public money as may have been voted by the district for the term; or in case no vote has been taken, for such portion as they think proper. But in no case can the trustees legally draw for more money than is due the teacher at the date of the order. If the public money is not sufficient to pay the teacher's wages, the trustees proceed to make out a rate bill for the residue, charging each parent, or guardian, according to the number of days' attendance of his children. Under the present law, the trustees have power to exempt indigent persons, and the amount exempted is a charge upon the district, and may be immediately collected by tax, or added to any tax thereafter levied. After the rate bill is completed, thirty days notice of its completion is given by the trustees, one of whom must be in attendance on a day and place appointed in said notice, once a week for two successive weeks, to receive payment; and during the whole of the said thirty days, any person may pay to either of the trustees, or to the teacher, the sum charged to him upon the rate bill. At the expiration of the thirty days, if all the persons named in the rate bill have not voluntarily paid, the trustees put it, with their warrant, into the hands of the district collector, who has the same authority to collect it, by levy and sale of goods and chattels, as a town collector. The collector is also authorized to collect fees, not only upon the money paid to him, but upon that paid voluntarily to the trustees and teacher, and he is allowed thirty days to make his return to the trustees.

A more troublesome or vexatious system could not well be devised. A teacher having performed his contract, is yet obliged, unless the trustees advance the money, to wait thirty, or sixty, days for his pay. The first thirty days' delay, under the notice, is no advantage to any one. The time of the trustees is spent uselessly. Is there any other instance upon the statute book in which legislation compels a man to wait sixty days for his wages, after he has completed his work? In the absence of any contract, the wages of the laborer are due and payable, when his work is done.

In the case of the teacher, the payment of his wages is postponed for sixty days after his school is closed; for payment from the trustees cannot be enforced, until the time fixed by the law for collection has expired. A slight error in the apportionment of the rates, or in the legal forms of making it, subjects the trustees to a suit by any one of whom a few cents may have been illegally collected; and unfortunately, there are not wanting, in every town, persons ready to avail themselves of such errors. The trustees can, if they choose, make out a tax for the amount of exemptions, and the collector is bound to collect it for the trifling fees upon a five or ten dollar tax list.

A law has been passed, authorizing courts to deny costs to a plaintiff in a suit against trustees, and also authorizing boards of supervisors to order a tax to be assessed upon a district, to refund costs and expenses incurred in suits by or against them, on account of the discharge of their official duties. But the law allows them nothing for their responsibility and labor, either in the discharge of their duties, or in the prosecution or defence of suits.

Now, a free school system may be devised, that shall relieve trustees from the duty of making out rate bills, or tax lists, in any case, and from all litigation arising therefrom, and which will secure to the teacher his pay when his work is done.

It may be made applicable only to the towns, requiring the cities, however, to make their schools free, but leaving them to adopt such an organization as shall be suited to their peculiar wants.

* See *Journal of Education*, Vol. I. pp. 36–45.

Teachers complain of the rate bill system, not only because it improperly withholds their wages, but because the trustees find great difficulty in exercising with fidelity, and at the same time satisfactorily, the power of exemption. While the cupidity of the tax payer is excited, the pride of men of moderate means is aroused, and their sense of independence revolts at being certified and put upon the record as indigent persons.

The rate bill system requires every person to pay in proportion to the attendance of his children. How strong, then, is the inducement of many parents to wink at absence and truancy, and how little are they inclined to second, by parental authority, the efforts of the teacher to enforce punctuality and regularity of attendance. The fact that the number of children attending school less than four months, uniformly exceeds the number attending a longer time, furnishes strong evidence for believing that the rate bill system is the principal cause of the irregular attendance of scholars.

FREE SCHOOL SYSTEM.

[From the Annual Report of the Superintendent of Common Schools for the State of New York, laid before the Legislature, 2nd January, 1849.

Letters have been addressed to the Superintendent from various parts of the State, urging him to recommend to the Legislature the free school system, and assuring him that the people are ready to sustain the Legislature.

A free school is one whose doors are open to all who choose to enter.

In Connecticut, Vermont, Massachusetts, Rhode Island, New-Hampshire, and Maine, the Common Schools are nearly free, and in several of the cities and large villages of those States, as well as in some of our own, they are entirely so.

In Indiana, the question has been recently submitted to the people, and a large majority decided in favor of free schools. Even in South Carolina, the schools are free to the free. I believe it is true, that in every State, county, town or village, where the question has been submitted to the decision of the people, they have been found in favor of the system.

The places in which the free schools are maintained, with the population of each in 1845, are as follows :—

New-York,	371,223	Williamsburgh	11,338
Buffalo,	29,773	Poughkeepsie,	9,000
Brooklyn,	59,566	Flushing,	3,918
Syracuse,	10,000	Newtown,	5,513
Rochester,	25,265	Bushwick,	1,857
Lansingburgh,	4,000		
		Total,	531,453

The whole population of the State in 1845, was 2,604,495.

It appears, therefore, that free schools are established in a portion of the State containing one-fifth of the entire population.

If to the above, we add the following places in which the schools are substantially free, although not by force of law, the above proportion will be increased to one-fourth :—

Albany,	41,139
Troy,	21,709
Utica,	12,190
Total,	75,038

Sustained by the foregoing statistics, it may be safe to presume, that so large a portion of the State having adopted the free system, and being satisfied with its operation, a majority of the other section of the State is prepared to approve it also.

When it is said that the people are not prepared for free schools, it is only another form of expressing a belief, that they are opposed to taxation for their support. There is, doubtless, a respectable number of persons in every community, averse to taxation, not only for the support of schools, but for all the purposes of government; still, the Superintendent has an abiding confidence, that a majority of the legal voters, and a majority of the tax payers in this State, would vote to support the schools by taxation.

The annual reports of this Department furnish reasons for this belief.

The money raised by the supervisors, equal to the amount appropriated from the funds of the State, is cheerfully voted and paid. In addition to this, many towns, at their annual meetings, vote to

raise another sum equal to that required to be raised by general laws. The aggregate sum thus voted in the State every year, is very large.

It was in 1847,	\$199,000 08
do 1846,	155,974 20
do 1845,	195,151 15
do 1844,	191,473 93
do 1843,	179,800 52

These sums were raised by the inhabitants of towns, voluntarily, and under special laws inserted in the charters of cities and villages. It would appear from this, that the people are not opposed to taxation for free schools.

It is urged by the opponents of the system, that those who have property are taxed to educate their own, as well as the children of the poor; and that those who are blessed with property, but denied children, are also obliged to contribute something for the education of the indigent. Those who have omitted their duty, or are more fortunate than their neighbors in the possession of property, have no reason to complain of the trifling burden which good fortune imposes upon them.

The security of property is one of the paramount objects of government, but how shall that security be attained? By the stern restraints and crushing force of military power?

The experience of the last year in Europe and America has proven, that there is greater security in the general intelligence and education of the people, than in an overawing soldiery.

Europe has been convulsed—cities have been the scenes of fearful and mortal strife—fields have been laid waste by contending armies—governments have been overthrown—revolution has followed revolution—uncertainty and insecurity are stamped upon all things,—political changes have been effected only by civil war and commotion. The people of the United States have effected the choice of a chief magistrate involving a change in the policy of the government. It was accomplished in a day, with the cheerful and peaceful acquiescence of the Union.

These are the results of the intelligence and moral elevation of the American people.

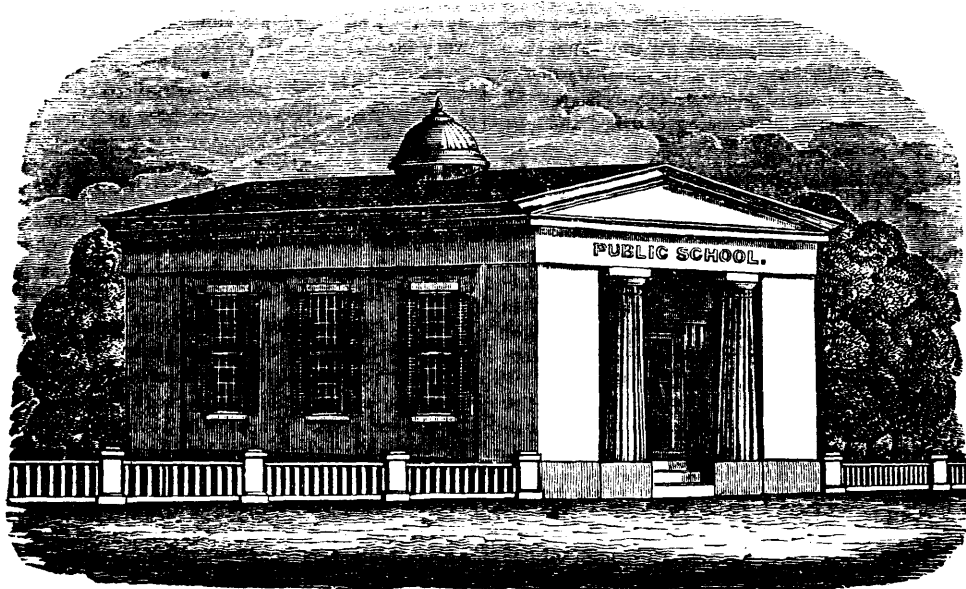
There is a moral and intellectual power in the universal education of the people, which furnishes more abiding security for persons and property than disciplined armies.

Property must be taxed to support a soldiery. Why should it not then contribute to a system of protection which may preclude the necessity of armies. Crime and pauperism are too often the results of ignorance. The detection and punishment of the one, and the support of the other, are mainly effected by the imposition of taxes upon property.

Is it not wise, then, to establish a system of education, universal and complete, which may in a great measure prevent the commission of crime, and avoid the evils of pauperism.

SCIENCE AND ART.

Art is the application of science to useful purposes. Science is the head to conceive,—art the arm to execute. They are, together, in emblems, as sisters. Science is the elder, and it is her province to lead art, the younger. Science assumes that she is less liable to stumble, and claims that art should follow. Yet it must be confessed, that the great romp often gets ahead, and frequently finds shorter and more eligible routes in which her elder sister is glad to travel. Yet they love each other, and their path is the same, and their journey is ever onward. Around them the forest falls, and the rays of the sun come in upon the bosom of the earth. Cottages spring up, and flowers blossom. The neighboring woods echo to the ring of the anvil and the noise of the saw-mill, for the wild wood stream is dammed and throbs like a great artery with a flutter-wheel for a heart. Together, they have done wonders. They have timed the arrows of light, and have split the sunbeam into rainbows. They have marked out paths on the restless ocean, and measured its tides. They have stolen from the moon the secret of her motion, and betrayed the mystery of her eclipses. It is as though they had hung a pendulum to the clock-work of the universe, and registered its motions upon a dial.—Dr. Waterbury.



FRONT ELEVATION OF A SUPERIOR SCHOOL-HOUSE, WITH VENTILATING APPARATUS IN THE CUPOLA.

School Architecture.

(BY THE HON. HENRY BARNARD, STATE COMMISSIONER OF PUBLIC SCHOOLS IN RHODE ISLAND.)

In treating of School Architecture, it will be convenient to present:—I. Common Errors to be avoided. II. General Principles to be observed. III. Plans and directions for erecting and fitting up school-houses adapted to the varying circumstances of country and city, of a small, and a large number of scholars, of schools of different grades and of different systems of instruction.

I. COMMON ERRORS IN SCHOOL ARCHITECTURE.

Under this head it will be sufficient to enumerate the principal features of school-houses as they are.

They are, almost universally, badly located, exposed to the noise, dust and danger of the highway, unattractive, if not positively repulsive in their external and internal appearance, and built at the least possible expense of material and labor.

They are *too small*. There is no separate entry for boys and girls appropriately fitted up; no sufficient space for the convenient seating and necessary movements for the scholars; no platform, desk, or recitation room for the teacher.

They are *badly lighted*. The windows are inserted on three or four sides of the room, without blinds or curtains to prevent the inconvenience and danger from cross-lights, and the excess of light falling directly on the eyes or reflected from the book, and the distracting influence of passing objects and events out of doors.

They are *not properly ventilated*. The purity of the atmosphere is not preserved by providing for the escape of such portions of the air as have become offensive and poisonous by the process of breathing, and by the matter which is constantly escaping from the lungs in vapor, and from the surface of the body in insensible perspiration.

They are *imperfectly warmed*. The rush of cold air through the cracks and defects in the doors, windows, floor and plastering is not guarded against. The air which is heated is already impure from having been breathed, and made more so by noxious gases arising from the burning of floating particles of vegetable and animal matter coming in contact with the hot iron. The heat is not equally diffused, so that one portion of a school-room is frequently overheated, while another portion, especially the floor, is too cold.

They are *not furnished with seats and desks*, properly made and adjusted to each other, and arranged in such a manner as to promote the comfort and convenience of the scholars, and the easy supervision on the part of the teacher. The *seats* are too high and too long, with no suitable support for the back, and especially for the younger children. The *desks* are too high for the seats, and are

either attached to the wall on three sides of the room, so that the faces of the scholars are turned from the teacher, and a portion of them at least are tempted constantly to look out at the windows,—or the *seats* are attached to the wall on opposite sides, and the scholars sit facing each other. The *aisles* are not so arranged that each scholar can go to and from his seat, change his position, have access to his books, attend to his own business, be seen and approached by the teacher, without incommoding any other.

They are *not provided with blackboards, maps, clock, thermometer*, and other apparatus and fixtures which are indispensable to a well-regulated and instructed school.

They are *deficient in all* of those in and out-door arrangements which help to promote habits of order, and *neatness*, and cultivate delicacy of manners and refinement of feeling. There are no verdure, trees, shrubbery and flowers for the eye, no scrapers and mats for the feet, no *hooks* and *shelves* for cloaks and hats, no well, no sink, basin and towels to secure cleanliness, and no places of retirement for children of either sex, when performing the most private offices of nature.

Such are some of the common features of school-houses as we now find them in city and country, which must be avoided in structures of this kind, if due regard is had to the convenience, health, and successful labor of those who are to occupy them.

II. GENERAL PRINCIPLES OF SCHOOL ARCHITECTURE.

I LOCATION—STYLE—CONSTRUCTION.

The *location* should be *dry, quiet, pleasant*, and in every respect *healthy*. To secure these points and avoid the evils which must inevitably result from a low and damp, or a bleak and unsheltered site, noisy and dirty thoroughfares, or the vicinity of places of idle and dissipated resort, it will sometimes be necessary to select a location a little removed from the territorial centre of the district. If possible it should overlook a delightful country, present a choice of sunshine and shade, of trees and flowers, and be sheltered from the prevailing winds of winter by a hill-top, or a barrier of evergreens. As many of the pleasant influences of nature as possible should be gathered in and around that spot, where the earliest, most lasting, and most controlling associations of a child's mind are formed.

In the city or populous village, a rear lot, with access from two or more streets, should be preferred, not only on the ground of economy, but because the convenience and safety of the children in going to and from school, the quiet of the school-room, and the advantage of a more spacious and retired play-ground will be secured.

The style of the exterior should exhibit good, architectural proportion, and be calculated to inspire children and the community generally with respect to the object to which it is devoted. It should bear a favorable comparison, in respect to attractiveness, convenience

and durability, with other public edifices, instead of standing in repulsive and disgraceful contrast with them. Every school-house should be a temple, consecrated in prayer to the physical, intellectual, and moral culture of every child in the community, and be associated in every heart with the earliest and strongest impressions of truth, justice, patriotism, and religion.

The school-house should be constructed throughout in a workmanlike manner. No public edifice more deserves, or will better repay, the skill, labor, and expense, which may be necessary to attain this object, for here the health, tastes, manners, minds, and morals of each successive generation of children will be, in a great measure, determined for time and eternity.

2. SIZE.

In determining the size of a school-house, due regard must be had to the following particulars :—

First—A separate entry, or lobby, for each sex, furnished with scraper, mat, hooks or shelves, sink, basin and towels. A separate entry thus furnished, will prevent much confusion, rudeness, and impropriety, and promote the health, refinement, and orderly habits of children.

Second.—A room, or rooms, large enough to allow, 1st, each occupant a suitable quantity of pure air, i. e. at least 150 cubic feet; 2nd, to go to and from his seat without disturbing any one else; 3d, to sit comfortably in his seat, and engage in his various studies with unrestricted freedom of motion; and, 4th, to enable the teacher to approach each scholar in his seat, pass conveniently to any part of the room, supervise the whole school, and conduct the readings and recitation of the several classes properly arranged.

Third.—One or more rooms for recitation, apparatus, library, and other purposes.

3. LIGHT.

The arrangements for light should be such as to admit an abundance to every part of the room, and prevent the inconvenience and danger of any excess, glare, or reflection, or of cross-light. A dome, or sky-light, or windows set high, admit and distribute the light most steadily and equally, and with the least interruption from shadows. Light from the north is less variable, and imparts less of cheerfulness and warmth than from other directions. Windows should be inserted only on two sides of the room, at least three and a half or four feet from the floor, and should be higher and larger, and fewer in number than is now common. There should be no windows directly back of the teacher, or on the side towards which the scholars face, unless the light is modified by curtains or by ground glass. Every window should be suspended with weights, and furnished with blinds and curtains; and if in a much frequented street, the lower sash should be glazed with ground glass.

4. VENTILATION.

Every school-room should be provided with means of ventilation, or of renewing the vital portions of the atmosphere which are constantly absorbed, and of removing impurities which at the same time are generated, by the breathing and insensible perspiration of teacher and pupils, and by burning fires and lights.

The importance of some arrangements, to effect a constant supply of pure air in school-rooms, where fires or lights are kept burning, has been strangely overlooked, to the inevitable sacrifice of health, comfort, and all cheerful and successful labor. We practically defeat the beautiful arrangements of our Creator by which the purity of the air would otherwise be preserved by its own constant renewal. We voluntarily stint ourselves in the quantity and quality of an article, which is more necessary to our growth, health and comfort, than food or drink, and which our beneficent Father has furnished pure to our very lips, and so abundantly that we are, or should be if we did not prevent it, literally immersed in it all our lives long.

The atmosphere which surrounds our earth to the height of forty-five miles, is composed mainly of two ingredients, oxygen and nitrogen, with a slight admixture of carbonic acid. The first is called the vital principle, because by forming and purifying the blood it alone sustains life, and supports combustion. But to sustain these processes, there is a constant consumption of this ingredient going on, and, as will be seen by the facts in the case, the formation and accumulation of another ingredient, carbonic acid, which is deadly hostile to animal life and combustion. This gas

is sometimes found in wells, and will there extinguish a lighted candle if lowered into it, and is not an uncommon cause of death in such places. It is almost always present in deep mines and at the bottom of caverns. Near Naples there is one of this description, called the Grotto del Cane, or the Grotto of the Dog, because the guides who accompany strangers to the interesting spots in the vicinity of Naples, usually take a dog along with them to show the effects of this gas upon animal life. Being heavier than common air it flows along the bottom of the cavern, and although it does not reach as high as the mouth or nostrils of a grown man, no sooner does a dog venture into it, than the animal is seized with convulsions, gasps and would die if not dragged out of it into the pure air. When recovered, the dog shows no more disposition to return to the cavern, than children do to go to some schools, where experiments almost as cruel are daily and hourly tried. But this gas, bad as it is in reference to animal life and fires, is the essential agent by which our earth is clothed with the beauty of vegetation, foliage, and flowers, and in their growth and development, helps to create or rather to manufacture the oxygen, which every breathing creature and burning fire must consume. The problem to be solved how shall we least mar the beautiful arrangement of Providence, and appropriate to our own use as little as possible of that, which though death to us, is the breath and the life-blood of vegetation.

The air which we breathe, if pure, when taken into the mouth and nostrils, is composed in every one hundred parts, of 21 oxygen, 78 nitrogen, and one of carbonic acid. After traversing the innumerable cells into which the lungs are divided and subdivided, and there coming into close contact with the blood, these proportions are essentially changed, and when breathed out, the same quantity of air contains 8 per cent. less of oxygen, and 8 per cent. more of carbonic acid. If in this condition (without being renewed,) it is breathed again, it is deprived of another quantity of oxygen, and loaded with the same amount of carbonic acid. Each successive act of breathing reduces in this way, and in this proportion, the vital principle of the air, and increases in the same proportion that which destroys life. But in the mean time what has been going on in the lungs with regard to the blood? This fluid, after traversing the whole frame, from the heart to the extremities, parting all along with its heat, and ministering its nourishing particles to the growth and preservation of the body, returns to the heart changed in color, deprived somewhat of its vitality, and loaded with impurities. In this condition, for the purpose of renewing its color, its vitality and its purity, it makes the circuit of the lungs, where by means of innumerable little vessels, inclosing like a delicate net-work each individual air-cell, every one of its finest particles comes into close contact with the air which has been breathed. If this air has its due proportion of oxygen, the color of the blood changes from a *dark purple* to a *bright scarlet*; its vital warmth is restored, and its impurities, by the union of the oxygen of the air with the carbon of blood, of which these impurities are made up, are thrown off in the form of carbonic acid. Thus vitalized and purified, it enters the heart to be sent out again through the system on its errand of life and beneficence, to build up and repair the solid frame work of the body, give tone and vigor to its muscles and resting all its nerves to vibrate in unison with the glorious sights and thrilling sounds of nature, and the sad, still music of humanity.

But in case the air with which the blood comes in contact, through the thin membranes, that constitute the cells of the lungs, does not contain its due proportion of oxygen, viz. 20 or 21 per cent., then the blood returns to the heart, loaded with carbon and other impurities which unfit it for the purposes of nourishment, the repair, and maintenance of the vigorous actions of all the parts, and especially of the brain, and spinal column, the great fountains of nervous power. If this process be long continued, even though the air be but slightly deteriorated, the effects will be evident in the languid and feeble action of the muscles, the sunken eye, the squalid hue of the skin, the unnatural irritability of the nervous system, a disinclination to all mental and bodily exertion, and a tendency to stupor, headache and fainting. If the air is very impure, i. e. has but little or no oxygen and much of carbonic acid, then the imperfect and poisoned blood will act with a peculiar and malignant energy on the whole system, and especially on the brain, and convulsions, apoplexy, and death must ensue.

Educational Intelligence.

CANADA.

Examination of Indian Scholars.—The *Cobourg Star* gives an interesting account of a recent examination of Indian youth at the Alder-ville Industrial School, Alnwick, from which we learn that at the School "14 Indian scholars are supported by the funds of the Indians, and that 12 more are sent from the village as day scholars, making the number 26 in all. There are, however, 40 children at the School,—the remaining 14 being white children from the Township of Alnwick.

"During the examination of the boys, the girls (who are taught in another house,) came in with their teacher, Miss Cook. These we found had made great progress in Geography, Reading, and Arithmetic. And we were assured by their teacher that they were equally proficient in housekeeping, sewing, cooking, &c. &c.

"The boys who acquitted themselves best, were Israel Hill and John Paul. The second best were Henry Clinch and J. Marsden. The girls who appeared to the best advantage were Dinah Pigeon, Hetty Crawford, and Miss Comego."

Victoria College—Governor General's Prize.—We understand that the very handsome sum of five pounds, to be expended in books, will be given by His Excellency the Governor General, to the student in the Principal's class who shall best acquit himself in Paley's Evidences of Christianity, at the next public annual examination, which will take place on the 1st of May.—[*Cobourg Star*.

Grammar School at Streetsville.—On Saturday last a meeting of the inhabitants of Streetsville and its vicinity, was held in the new Brick School House, for the purpose of considering the proposed endowment of a Grammar School. The Rev. Mr. Macgeorge read a communication from the Rev. H. J. Grasett, which stated in effect: That the Board of Trustees for the Grammar School of the Home District, had been authorized by His Excellency the Governor General, to offer the sum of £75 currency for the year 1849, towards the support of a Grammar School in Streetsville, provided that an appropriate building be erected in the course of the year, and vested in Trustees. The following resolutions were unanimously adopted by the meeting:—

Resolved, 1st. That the said offer, according to the letter of the Rev. H. J. Grasett, of the 3rd instant, be thankfully accepted by this meeting.

Resolved, 2nd. That the Rev. R. J. Macgeorge and the Rev. W. Rintoul be authorized to receive offers of Sites for a Grammar School, now and until the 4th February, and to determine on the particular Site that may seem to them most eligible for such School, this meeting pledging themselves to abide by their decision in this matter.

Resolved, 3rd. That a subscription paper be now opened for the erection of a substantial Brick House on such Site as Messrs. Macgeorge and Rintoul shall determine—Subscription to be payable in such instalments as the subscribers see fit on or before the first day of January, 1850.

We are happy to state that before the meeting broke up a considerable sum was subscribed, and sites for the proposed building were offered.—[*Streetsville Review*.

Extracts from the 2nd Report of the Supt. C. S., Town of Bytown, to the Board of Trustees.—The Superintendent begs leave to report that he has personally examined into the condition of Schools, and the efficiency of the scholars, as far as practicable in a cursory visit; and will embody in the report (seriatim) such description of the position of each, as may be necessary, for the guidance of the Trustees:—Rev. Mr. MIGNAULT's Day School is in operation since November, 1847. Teaches about 100 scholars of various denominations in the following branches, viz: Reading, Writing, Arithmetic, Book-keeping, English Grammar, French, Geography, and History; the R. C. Catechism; uses the National School Books. The Night school is attended by thirty-six scholars of various denominations, and are similarly instructed in the branches already named. Found the scholars in a very satisfactory state of proficiency in the several classes. They are principally French Canadians and Irish. The Upper Town School, under the management of Sister COULAN, is in operation since first March, 1848. There are 26 scholars of various denominations; teacher, female.—Reading, Writing, Arithmetic, English Grammar, Geography, Drawing, Music, and French. Uses National School Books and R. C. Catechism. The Lower Town schools are distinct; English and French females; in operation since 1st March, 1845. The French School is denominational. Teach 104 scholars, Drawing, Music, and Embroidery; use French School Books, religious and instructive. The English school consists of 112 female scholars of various denominations, also in operation since 1st March, 1845. Teach French, Embroidery,

Drawing, and Painting; use the National School Books and R. C. Catechism. The scholars in both schools are in a generally efficient state as to acquirements and discipline. HUGH HAGAN, a qualified teacher, has kept school since 1837. His scholars are of various denominations, male and female. Since 1st January, 1848, eighty-two scholars have entered his school, of which 29 were Protestants, and 53 Roman Catholics. There are now 33 in actual attendance. Uses National School Books. Found the scholars in a very efficient state, and particularly in penmanship. JEREMIAH O'LEARY has kept school for five years. His school is mixed; returns 39 scholars, all very young. Teaches the usual primary branches. When visited there were about 20 scholars present. JAMES MALONEY has kept school for 20 years. Scholars are of various denominations, male and female; returns 82. Teaches the usual branches; uses National and other School Books. When visited there were about 20 scholars present. FRANCIS DOWLER has kept school for two and a-half years. Returns 52 scholars, two of which are R. Catholics, all males. Teaches (in addition to the usual branches) Composition, Recitation, Geometry, Algebra, Scripture Reading and Instruction; uses Books recommended by Board of Education at Toronto. Mrs. SPROULE has kept school for two and a quarter years. Twenty-five scholars, male and female, of various denominations. Teaches the usual branches, and needlework, Church of England Catechism, and Bible Reading, uses various school books. Mrs. CLORAW has kept school for seven years; returns 68 scholars (at intervals during the year) of various denominations, male and female. Teaches the usual branches, and uses National and other School Books. The Misses FRASER have kept school for nineteen months; have never received any support from Public Funds. Return 68 scholars, two of whom are R. Catholics, and ten male pupils under fourteen. Teaches the highest branches of female education, including Botany, Rhetoric, Drawing, French, Calligraphics, Music, Needlework, Geography, and the use of the Globes. The school opens with prayer, and Bible instruction is given to the scholars. Miss SIMPSON has kept school for nine months; has about 20 scholars, male and female, five of them R. Catholics. Teaches the simple branches of education for children, with Catechism and Christian instruction. Miss BURWISS has kept school for twelve months; school denominational; male and female. Eighteen pupils, 7 males, eleven females. Uses National School Books, and teaches the usual branches for children. JOHN ROBINSON has kept school for twelve months; has an average of thirty scholars of various denominations, males and females. Teaches the usual branches with rudiments of Latin.—The Superintendent, in presenting this Report on the general state of the schools, would beg leave to recommend that the Board would, if possible, divide the town into school sections, as required by law. Also, to establish a regular and uniform system in the school books to be used, and method of classification. The books most approved, are those published under the direction of the Commissioners of National Education in Ireland, and recommended by the Board of Education for Upper Canada, to be used in Canadian schools, by which means scholars, who by change of residence, may be removed to another school, may not labour under the disadvantage and loss by change of system; and to insist on the teacher's complying with the requirements of the School Act, in making their Quarterly and Annual returns, in conformity with the Forms, Regulations, and Instructions provided by the Chief Superintendent of Schools, which are in the possession of each qualified teacher.

The Superintendent would also recommend the Board of Trustees to appoint Local Committees for each school as provided by law, at as early a period as possible, on the judicious selection of which much will depend in securing the regularity and harmony in the working out the principles of the School Act, which, it must be obvious to the Board, is of paramount importance and highly essential to the attainment of a satisfactory result in their labours as Trustees.

All which is respectfully submitted,

JOHN ATKINS,

Supt. Com. Schools.

Bytown, Dec. 19, 1848.—[*Bytown Gazette*.

BRITISH AND FOREIGN.

New Training Schools at Norwich, &c., England.—Arrangements are in progress for the erection of a Training School on a large scale for Schoolmistresses, in Norwich. A Training School for Schoolmasters is also to be erected at Chichester, with accommodation for a Principal, Vice-Principal, and 24 students. The building is to comprise a class-room, dining-room, and dormitory, in accordance with the requirements of the Committee of Council on Education. The cost of the proposed buildings at Chichester is estimated at about £4000, sterling.—[*London News*.

The EARL OF AMHERST has resigned his office of Vice President of the National Society for Education.—[*Ibid*.

Cambridge University.—The Le Bas Prize.—A sum amounting to about £1,920, Three per Cents, having been accepted by the University of Cambridge for the purpose of founding an annual prize, consisting of the interest of the above-mentioned fund, to be called the "Le Bas Prize," for the best English essay on a subject of general literature, such subject to be occasionally chosen with reference to the history, institutions, and probable destinies and prospect of the Anglo-Indian empire, the examiners have issued a notice, that the subject for the first prize is, "The historical and chronological determinations of the extent, duration, and succession of the several principalities established in Bactria and on the confines of India by Greek Princes after Alexander's invasion of India."—[London Watchman.

Grammar Schools in England.—In England and Wales there are 434 endowed Grammar Schools. Of these, the date of the foundation is ascertained in 301 cases, and unknown in 133. The oldest on record is that of Brackley, in Northamptonshire, which was founded in 1158; and the most recent that of Talkin, in Cumberland, in 1803.—[Ibid.

The New Colleges, Ireland.—It has been determined to open the new Queen's Colleges in Belfast, Cork, and Galway, in October next. Two of the principals, Sir Robert Kane and the Rev. Dr. Henry, are in London, and have had interviews with some Members of the Cabinet on the subject. The professors are soon to be nominated, and very liberal salaries are allowed, in order to secure persons fully qualified. There are to be twenty professors in each college. The professors, in the six following branches, are to have £250 per annum each:—The Greek language, history and English literature, logic and metaphysics, mathematics, natural philosophy. In the five following branches, the salary is fixed at £200:—Chemistry, anatomy and physiology, natural history, modern languages, mineralogy and geology, and curatorship of museum. In jurisprudence and political economy, English law, civil engineering, and agriculture, and each of the four professors is to have a salary of £150. In each of the following five branches the salary of the professor is to be £100.—Irish language, practice of medicine, practice of surgery, materia medica, and midwifery; but all the professors will be entitled to receive, in addition to the fixed salary, the regulated class fees, to be paid by the students attending the lectures. In each of the Colleges there will be forty-five junior scholarships of the value of £30 each. There are also to be senior scholarships, of the value of £50 each. A vast number of candidates for professorships, including some gentlemen distinguished in literature and science in England and Scotland, have already sent in their applications to the Irish Government.—[Chronicle.

School of Design in Belfast.—The Lord Lieutenant has caused an intimation to be forwarded here, that the Government have determined on the establishment of three schools of design in Ireland. One of these should, undoubtedly, be located in Belfast; and we understand that his Excellency is disposed to render every assistance towards that object, if the people of the town show that they are willing to do their part. A public meeting is called for Monday next, to ascertain the opinion of the rate-payers on the matter, which is one of very considerable importance to Belfast, and, indeed, to the province of Ulster generally. As might be expected a preliminary committee has been already formed.—[Northern Whig.

Education in Scotland.—The Scottish Educational Institute has issued its second Report, from which it appears that the body now consists of 386 fellows, 193 senior, and 121 junior licentiates, in all 700—a strength that is very creditable, and shows strikingly what Teachers and other professional persons can do when, instead of waiting for external means of elevation, they take their cause into their own hands. The attendance at the Edinburgh University is more than usually numerous this session, the number of matriculated students exceeding by 112 the number that was enrolled at the corresponding period of last year. The principal increase is in the law and literary faculties.—[London News.

Royal School of Armagh.—The Commissioners of Education are about to expend a large sum on the repair and improvement of the building of this school, especially of the dormitories, which are to be arranged on the plan adopted in the College of St. Columba, and which has been so highly approved of by all persons who have visited that establishment. Regulations have been recently laid down by the Commissioners respecting the admission of free day scholars into Armagh School, in accordance with which a free education is to be given to ten pupils, four of whom are to be admitted in the first year, four in the second, and two in the third. The free scholars are to be eligible from among the children of resident householders of the city of Armagh, whose houses are rated at ten pounds a-year under the poor law valuation, and from the tenants of the school estate who

pay a rent of twenty pounds. The free day scholars must at the time of their admission be of the age of ten years at least, and must not exceed the age of thirteen. Candidates are to submit their names to the head master, who is to examine and select such as he thinks most eligible, and most likely to benefit by the education afforded in the school; and no free day scholar is to remain in the school free of charge after he has attained his seventeenth year.—[Armagh Guardian.

Rev. Dr. Hincks.—It is reported that, in common with many others, the name of Dr. HINCKS, of Killlileagh, (near relative of the Inspector-General of Canada) has been put forward in connection with the vacant Bishopric of Down. He is well known to be one of the most learned men, not only in the diocese of Down, but in the kingdom. He has from the first been a friend to the National system of Education, and to liberal measures generally, and while a distinguished ornament of Trinity College, he would, we have no doubt, lend his influence to the carrying out of any enlightened plans for advancing the interests of science and literature in the north of Ireland. In private life he is in all respects most estimable.—[Banner of Ulster.

Queen's Colleges, Ireland.—The buildings of the new colleges in Cork, Galway, Belfast, and Maynooth, are proceeding towards completion, and our readers will have observed that the various professorships are advertised as open to candidates. The architects of the new buildings are, respectively, Sir Thomas Deane, Mr. Keene, Mr. Lanyon and Mr. Pugin. That at Belfast is the most forward, and will probably be completed in the beginning of next year. The sites selected are about ten acres each, and the style of architecture adopted in each case is the Gothic. The Cork College occupies three sides of a quadrangle. The extent of the north, or entrance front, is 290 feet 9 inches; of the east front 232 feet; and of the west front, 191 feet. The library, to the right of the examination hall, is 56 feet, by 28 feet. The main quadrangle is 215 feet 9 inches, by 161 feet.—[The Builder.

People's College, Nottingham.—A female adult night school has been opened, in connection with the People's College, at Nottingham. The classes meet three times a-week. The school fee is 4d. a-week. The average attendance during the winter months has been about forty-five. The subjects of instruction are the ordinary branches of an English education—reading, writing, and arithmetic, along with such portions of grammar and geography as justice to the three fundamental branches will permit.—[London Watchman.

Colleges in the United States.—There are now, in the United States, 119 Colleges: 13 of which, are under the direction of the Baptists; 9 under the direction of the Episcopalians; 13 under the direction of the Methodists; 14 under the direction of the Roman Catholics; 9 under the direction of the Congregationalist; and 61, most of which are under the direction of the Presbyterians.—[New-York Observer.

A True Daughter.—Millard Fillmore, Comptroller of the State of New-York, and Vice-President elect, has a daughter, a scholar at the State Normal School, Albany, who is qualifying herself to be a teacher of Common Schools.—[Baltimore Clipper.

Common Schools in Pennsylvania.—The Report of the Superintendent shows that there are at present in that State 7,485 schools, in which 360,605 scholars are instructed, at an annual cost of \$701,732. Many of the female teachers receive but \$72 a-year; and several of the male teachers but \$144 a-year for their services.—[N. Y. Advocate & Journal.

Common School Fund and Normal School in the State of New Jersey.—From the Governor's Message to the Legislature of this State, at its recent assembling, it appears that the Common School Fund on the 1st of January 1849, amounted to \$380,448 33—which is an accumulation of \$9,705 38 on its amount at the beginning of 1848. The report of the State Superintendent shows a decided improvement in the public schools; in the increased number taught, in the large sum of money expended, and in general attention to the subject. The fund has so accumulated as to allow a farther annual appropriation, and the Governor recommends that the trustees be authorized to increase the sum annually appropriated for the support of schools, and that power be given to the people to raise more money for that purpose, at their annual town meetings. The plan of a Normal School, which will come before the Legislature at its present session, is recommended as one of the best methods of furnishing the schools of the State with competent teachers. Several townships have petitioned for permission to levy a tax for the support of free schools.—[N. Y. Spectator.

Journal of Education

FOR UPPER CANADA.

OPINIONS OF THE CANADIAN PRESS.

UPPER CANADA.

From the *St. Catharines Journal*.

JOURNAL OF EDUCATION.—We are in possession of the first number of this invaluable periodical for 1849, and certainly we must congratulate the Editor on his "Address." The subject of this Address is, the comparative advantages of "Free Schools," over any and all the other systems ever tried in this or any other country. Every possible objection is either quoted or anticipated—discussed and answered—in this able document. The advantages of the Free School system are so numerous, and so palpable, that we think they only require to be known in order to be appreciated—demanded by the people, and properly sustained. We never desire a less enviable situation than that of Trustee under the present imperfect system—vacillating between an inadequate provision for a suitable Teacher, and his stern duty in the important office to which he has been unwillingly appointed; anxious, on the one hand, to provide Education for the children of his Section, and on the other, restrained by the imperfect provision made by Law. The only objection, not anticipated, is that a large class of annuitants, not holding rateable property, yet no doubt deriving, as all must, advantages from the Education of the Country, would escape without paying anything, or at least by paying a mere trifle. This, however, may be provided against. We recommend this document to every man anxious to be informed on this all-important question.

From the *Toronto Patriot*.

We beg to acknowledge the receipt of the first number of the second volume of this periodical. The first article is an Address from Dr. RYERSON, showing why the Common Schools should be supported by general taxation, instead of being left, as at present (in general), to the whim or caprice of the parties who may make use of them for their children. The subject is well and successfully handled, and we feel ourselves almost convinced. We had prepared several long extracts from it, but are compelled to omit them from the pressure of Parliamentary Intelligence. However, we strongly recommend our readers to read the whole article, and judge for themselves.

From the *Niagara Mail*.

The first number of the second volume of this much esteemed and useful publication has come to hand, much improved in appearance, and, as usual, highly interesting to all who are engaged in, or wish to be informed on, the subject of Education.—Several excellent plans of School houses, very neatly executed, make the number before us more interesting than usual. The increased expense thus incurred by the publisher, for the benefit of the people, should not be lost sight of, and, it is to be hoped, will be met by them generally with that encouragement that so highly beneficial an enterprise deserves.

From the *British Colonist*.

The first number of the new series of the "Journal of Education for Upper Canada" has been received, and we have much pleasure in renewing our recommendation in favour of the work. The department of School Architecture has been introduced, as promised in the prospectus, and the number before us contains a variety of School-house plans, with explanations of the designs, which must be of great benefit to the community at large. The successive numbers of the "Journal of Education" for the year 1848 were well stored with information, not accessible to the general reader in other works or periodicals in this Province, and arrangements already made for the current year are full of promise for further improvement. The introduction of School Architecture, exhibiting drawings or engravings of the best and most suitable plans of School houses, we regard as an excellent feature in the work, from which great advantages must be derived by the Province at large.

From the *Prescott Telegraph*.

The first volume of this excellent educational journal is now completed, and with the January No. the work enters upon its second year. We are glad to learn that the Journal is increasing in popularity and usefulness; and we hope it will be, as it deserves, amply supported by the people of this Province. We have no doubt that, under the able control of the talented editors, the "Journal of Education" will accomplish much good.

From the *Perth Constitutional*.

We have received the first number of the "Journal of Education for U. C." in its new shape. Though intended expressly for Canada, this is a periodical entitled to the support of every man who can read the English language, or who wishes that his children may be able to do so.

From the *Barrie Magnet*.

We have received the "Journal of Education" for the month of January. In our next issue we will give a few extracts, and make a few remarks ourselves on the system of Free Schools, for it is important that not only the benefits resulting from a sound system of education should be well understood, but also that all persons, with or without families, should be convinced of the importance of it to themselves, and more particularly, that it would tend to well-directed enterprise, and consequently to a vast improvement in the Country.

From the *Church*.

We have already expressed our opinion that the design is good, and that such a publication, judiciously conducted, will be highly useful in promoting—as it professes to do—"the diffusion of information on the great work of popular education generally."

From the *Christian Guardian*.

The present number comes out much improved. It is regularly divided off into suitable departments, and among them we notice one, "School Architecture" which is beautifully embellished with engravings. This department will be found very useful to Trustees of Schools in arranging for the accommodation of the teachers and children.

The "Journal of Education" deserves to be well supported by the public, and we see no reason why its circulation should not be increased four fold.

From the *Simcoe Standard*.

We have received the first number of Vol. II, of this excellent and highly useful work, in quarto form, but have not time to peruse it at present. In our next we shall give some extracts from the Address of the Chief Superintendent, on the subject of Free Schools.

From the *Long Point Advocate*.

We sat down to the perusal of the "Journal" rather prejudiced against it. Becoming interested in its contents, we read with a good deal of care, and must admit that we were agreeably disappointed. The articles are well written; and on the whole, we must say, that we consider the publication worthy of general encouragement.

From the *Hamilton Spectator*.

It is intended to make this volume even more interesting than the first, by the publication of approved designs for school-houses; for which drawings are now in course of preparation. The small, badly constructed, ill-lighted and ventilated, and in winter half-warmed edifices which are now so prevalent, are a positive disgrace to the country, and the Conductors of the "Journal of Education" are entitled to the gratitude, both of the rising generation, and of every inhabitant of the Province, for their movement in the matter. We beg once more to recommend the Journal to the cordial support of the Canadian public.

From the *Guelph & Galt Advertiser*.

This publication presents a respectable appearance. We are justified in saying that the talents of its Conductor will ensure for it a great degree of popularity, and, we hope, of usefulness.

From the *Guelph Herald*.

We anticipate a greatly increased circulation of this useful periodical, which its merits fully deserve.

From the *Hamilton Gazette*.

Especially should this work be in the hands of those who are far removed from "the busy hum of the city," who have no opportunity of communing with friends on the subject which is of vital importance to their progeny. The subject matter of the work is of a very instructive character and written in a terse strain.

From the *Bytown Packet*.

The "Journal of Education" contains many useful articles, and should be in the hands of all Schoolmasters and Superintendents.

From the *Bytown Gazette*.

We deem the present, a fitting opportunity of expressing our admiration of the ability with which the "Journal" has been conducted, and our best wishes for its future prosperity. The talented Chief Superintendent has devoted much time and labour to this work gratuitously, irrespective of his acknowledged assiduity in the discharge of the important duties of his office. The "Journal of Education," which was designed, and has been partially conducted by him, we regard as a most useful adjunct to the cause in which it is devoted, as a medium of disseminating information with respect to the work; and details of the School Act, and establishing uniformity of system in all matters connected therewith. To increase this usefulness, an extensive circulation only is required, and we hope this may not be wanting.

From the *Ottawa Advocate*.

The "Journal" contains a large sum of valuable information; and we shall shortly take the opportunity of making use of portions of its contents, to advance the cause of Education in our own District.

From the *Western Standard*.

This valuable work which has for its object the advancement of education, and the establishment of a sound system of instruction throughout the Province, should be in the hands of every Parent, Trustee, and School Teacher.

From the *Brantford Courier*.

This "Journal" is a highly creditable publication, containing much useful information respecting Common School education; and we doubt not the labors of the Chief Superintendent will be fully appreciated in attempting to place the Educational system in Upper Canada on a better footing. The work is published in Toronto and sent to subscribers at a charge of one dollar per annum. We wish the learned Dr. the greatest success in the arduous undertaking.

From the *Kingston Argus*.

We direct attention to the Prospectus of the "Journal of Education" for 1849. This interesting and useful publication is highly deserving of public patronage.

LOWER CANADA.

From the *Montreal Register*.

We are glad to learn that the success of the first year has proved so encouraging. The "Journal" is well conducted, and must be highly prized by Trustees and Teachers, for whose use it is primarily designed. It deserves to be patronized by all the friends of Education.

From the *Montreal Witness*.

This periodical is very ably conducted, and begins to be exceedingly interesting. If generally read, it is likely to raise up an interest on the whole subject of education, and invest it with a dignity which has been sadly wanting, hitherto, in Canada.

From *La Minerve*.

Cette intéressante publication se continue avec beaucoup de succès. Nous regrettons toujours que les instituteurs et les habitants de nos campagnes n'aient pas l'avantage d'avoir, en langue française, un journal comme celui-ci. Des publications de ce genre peuvent produire un bien immense.

From *L'Avenir*.

Nous voyons avec plaisir que son propriétaire se propose de l'améliorer de beaucoup au commencement de cette année. Il contiendra à l'avenir des vignettes pour illustrer les différents sujets qui y seront traités. Cette publication mensuelle qui contient 40 pages par année ne coûte que 5s. d'abonnement.

Collège de Ste. Anne, Lapocatière,
District de Québec, 16 Janvier, 1849.

A J. G. HODGINS, Ecuyer, Toronto.

MONSIEUR,

Apprenant, par les *Mélanges Religieux de Montréal*, qu'il se publie à Toronto un *Journal d'Education du H. C.*, sous l'habile direction du Rév. Mr. RYERSON, je conçois le désir de prendre un abonnement à cette publication qui ne peut manquer d'être très-intéressante.

Ci-inclus sont 10s. pour payer 2 années, 1848 & 1849. Veuillez m'envoyer les Nos. du 1er volume déjà publié, et ceux du 2nd volume à mesure qu'ils le seront. Adresse Rév. F. PILOTE, Collège de Ste. Anne, Lapocatière, Québec.

J'ai l'honneur d'être, Monsieur,

Votre très-humble Secrétaire,

F. PILOTE, P^{TE},
Procureur.

From the *British American Journal of Medical and Physical Science*.

The "Journal" is neatly printed, and contains a variety of valuable information on the subject in question, addressed in an especial manner to the Upper Canadian population, but not the less useful and important out of that section of the Province. In superintending the important department of education in the sister Province, Dr. RYERSON moves in a sphere for which his talents eminently adapt him, and which will be reflected in this publication. The attempt to diffuse information in the way specified is praise-worthy, and we hope that an undertaking which promises to prove of such great utility, will be adequately sustained, for the subject appeals directly to the best feelings of every parent and philanthropist in the Province.

From the *Quebec Brevan*.

The cause to which it is devoted is one in which we feel, and no one ought to do otherwise, the liveliest interest; and we earnestly wish that this periodical may subservise the ends of sound education, based upon Christian principle, and promoting the most important interests of the community.

From the *Phillipsburg Weekly Gleaner*.

We have received the first number of the second volume of the "Journal of Education." The contents are varied and interesting as usual. In this number we have some beautiful plans for School Architecture, as useful in this latitude as elsewhere, and as we are about to erect a building for the use of Schools in this place, we hope care will be taken to secure a good plan. We shall take an early opportunity of calling attention to the subject of Free Schools, so very ably discussed by the Rev. E. RYERSON, D. D.; in the mean time recommending the Journal to all friends of youth.

We are authorized to say that the Rev. Wm. SCOTT, of this place, will act as Agent for the "Journal of Education."

From "*Renewed Remarks on the State of Education in Canada, by 'L'*"

No better "manual" can be put into the hands of our Members of Parliament, to prepare them for thoroughly understanding the merits of the Common School question than the "U. C. Journal of Education." It contains a most valuable and instructive mass of information on every subject connected with the workings of different systems of public instruction, as now in operation, in every part of the world.

NOTICE.

NEATLY Stitced copies of the *First Volume of this Journal*, with handsomely printed Covers, can be obtained through the Post, on application to Mr. HODGINS, Toronto. Price 5s.

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* * All communications to be addressed to Mr. J. Geo. HODGINS, Education Office, Toronto.