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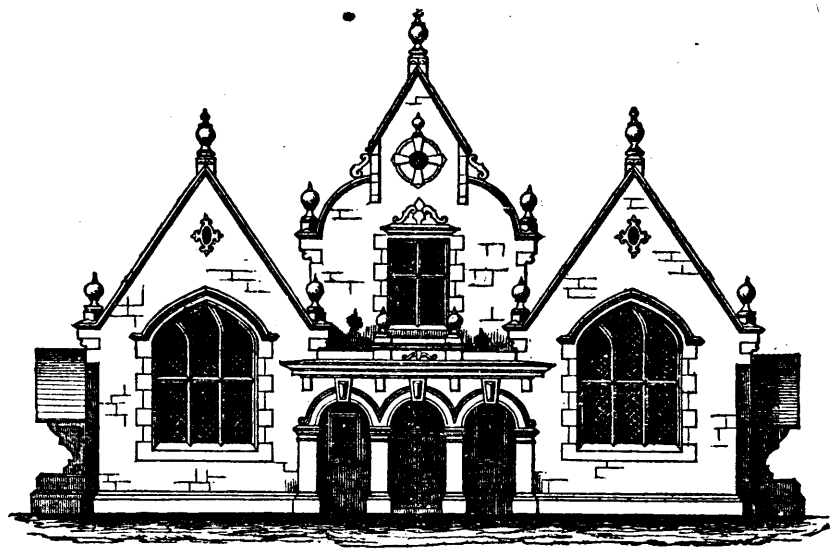


FRONT ELEVATION of one of the Series of School-houses (including residence of Teachers) recommended by Her Majesty's Privy Council Committee of Education. Description and interior arrangements will be given hereafter.

School Architecture.

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

[*Concluded from No. 2, page 29.*]

[In our last number the Common Errors in School Architecture were pointed out, and the general principles stated in respect to *location, style, construction, size, and light,* together with some remarks on *ventilation.* The remarks on *ventilation* are here concluded, and the remaining important topics of School Architecture are practically and admirably discussed.—*Ed. J. of E.*]

5. VENTILATION.

Symptoms of bad air in a School-room.]—Every man and woman, who received any portion of their early education in the common school, can testify to the narrow dimensions, and low ceiling of the school-rooms, and to the discomfort arising from the close, stagnant, offensive atmosphere, which they were obliged to breathe. Who does not remember the comparative freshness and vigor of mind and body with which the morning's study and recitations were begun, and the languor and weariness of body, the confusion of mind, the dry skin, the flushed cheek, the aching head, the sickening sensations, the unnatural demand for drink, the thousand excuses to get out of doors, which came along in succession as the day advanced, and especially in a winter's afternoon, when the overheated and unrenewed atmosphere had become obvious to every sense? These were nature's signals of distress, and who can forget the delicious sensations with which her balmy breath, when admitted on the occasional opening of the door, would visit the brow and face, and be felt all along the revitalized blood, or the newness of life with which nerve, muscle, and mind were endued by free exercise in the open air at the recess, and the close of the school? Let any one who is sceptical on this point visit the school of his own section, where his own children perhaps are condemned to a shorter allowance of pure air than the criminals of the State, and he cannot fail to see in the pale and wearied countenances of the pupils, the languor and uneasiness manifested, especially by the younger children, and exhaustion and irritability of the teacher, a demonstration that the atmosphere of the room is no longer such as the comfort, health and cheerful labor of both teacher and pupils require.

Effects of bad air on the Health of Teachers and Pupils.]—In this way the seeds of disease are sown broadcast among the young, and especially among teachers of delicate health. "In looking back," says the venerable Dr. Woodbridge in a communication on school houses to the American Institute of Instruction, "upon the languor of fifty years of labor as a teacher, reiterated with many a weary day, I attribute a great proportion of it to *mephetic air*; nor can I doubt, that it has compelled many worthy and promising teachers to quit the employment. Neither can I doubt, that it has been the *great cause* of their subsequently sickly habits and untimely decease." A physician in Massachusetts, selected two schools, of nearly the same number of children, belonging to families of the same condition of life, and no causes, independent of the circumstances of their several school-houses, were known to affect their health. One house was dry and properly ventilated—the other damp, and not ventilated. In the former, during a period of forty-five days, five scholars were absent from sickness to the amount in the whole of twenty days. In the latter, during the same period of time and from the same cause, nineteen children were absent to an amount in all of one hundred and forty-five days, and the appearance of the children not thus detained by sickness indicated a marked difference in their condition as to health.

The necessity of renewing the atmosphere, does not arise solely from the consumption of the oxygen, and the constant generation of carbonic acid, but from the presence of other destructive agents,

and impurities. There is carburetted hydrogen, which Dr. Dunglinson in his Physiology, characterizes, "as very depressing to the vital functions. Even while largely diluted with atmospheric air, it occasions vertigo, sickness, diminution of the force and velocity of the pulse, reduction of muscular vigor and every symptom of diminished power." There is also sulphuretted hydrogen, which the same author says, in its pure state, kills instantly, and in its diluted state, produces powerful sedative effects on the pulse, muscles, and whole nervous system. There are also offensive and destructive impurities arising from the decomposition of animal and vegetable matter in contact with the stove, or dissolved in the evaporating dish.

Two objects to be attended to.]—The objects to be attained are —the removal of such impurities, as have been referred to, and which are constantly generated, wherever there is animal life and burning fires, and the due supply of that vital principle, which is constantly consumed by breathing and combustion. The first can be in no other way effectually secured, but by making provision for its escape into the open air, both at the top and the bottom of the room; and the second, but by introducing a current of pure air from the out-side of the building, warmed in winter by a furnace, or in some other mode, before entering the room. The two processes should go on together—i. e. the escape of the vitiated air from within, and the introduction of the pure air from without. The common fireplace and chimney secures the first object very effectually, for there is always a strong current of air near the floor, towards the fire, to support combustion, and supply the partial vacuum in the chimney occasioned by the ascending column of smoke and rarified air, and in this current the carbonic acid and other impurities will be drawn into the fire and up the chimney. But there is such an enormous waste of heat in these fireplaces, and such a constant influx of cold air through every crevice in the imperfect fittings of the doors and windows, to supply the current always ascending in the chimney, that this mode of ventilation should not be relied on. The common mode of ventilating, by opening a window or door, although better than none, is also imperfect and objectionable; as the cold air falls directly on the head, neck, and other exposed parts of the body, when every pore is open, and thus causes discomfort, catarrh, and other more serious evils, to those sitting near, besides reducing the temperature of the whole room too suddenly and too low. This mode, however, should be resorted to at recess.

Openings for Ventilation.]—There should be one or more openings, expressly for ventilation, both at the top and the bottom of the room, of not less than twelve inches square, capable of being wholly or partially closed by a slide of wood or metal, and, if possible, these openings, or the receptacle into which they discharge, should be connected with the chimney or smoke-flue, in which there is always a column of heated air. By an opening in or near the ceiling, the warmer impurities (and air when heated, and especially when over-heated, will retain noxious gases longer) will pass off. By an opening *near the floor*, into the smoke-flue, the colder impurities (and carbonic acid, and the other noxious gases, which at first rise, soon diffuse themselves through the atmosphere, cool, and subside towards the floor) will be drawn in to supply the current of heated air and smoke ascending the chimney. These openings, however, may let cold air in, and will not always secure the proper ventilation of a school-room, unless there is a current of pure warm air flowing in at the same time. Whenever there is such a current there will be a greater economy, as well as a more rapid and uniform diffusion of the heat, by inserting the outlet for the vitiated air near the floor, and at the greatest distance from the inlet of warm air.

There is a mischievous error prevailing, that if a room is kept at a low temperature there is no need of ventilation. Dr. Alcott mentions the case of a teacher, who when asked if she did not find it difficult to keep her room ventilated, replied, "not at all, it is one of the coldest rooms in the city." The necessity of ventilation arises from the consumption of the oxygen and the generation and accumulation of carbonic acid principally in breathing, and both of these processes can go on and do go on, in a cold room, as well as in a warm one, if human beings are collected in it, and goes on rapidly and fatally according to the number of persons and the size and closeness of the apartment.

6. Temperature.

The means of producing, diffusing and duly regulating artificial heat in a school-room, is, in a climate like ours, another of the indispensable conditions of health, comfort and successful labor. To effect this, the structure must not be "a summer-house for winter residence," but be calculated to keep out the cold wind and especially to prevent its entering at cracks, and defects in the doors, windows, floors, plastering, so as to fall suddenly and directly on the feet, neck, or other sensative and exposed portions of the body. Fuel of the right kind, in the right condition, in suitable quantity and in due season must be provided. The best modes of consuming it so as to extract its heat and diffuse it equully through all parts of the room and retain it as long as is safe, must be resorted to. The means of regulating it, so as to keep up a uniform temperature in different parts of the room, and to graduate it to the varying circumstances of a school at different periods of the day, and in different states of the weather, must not be overlooked.

Methods of warming School-houses.]—The open stove with large pipe, not bending till the horizontal part is carried ten or twelve feet above the heads of the children, affords as effectual, economical and unobjectionable a mode of consuming the fuel and disseminating the heat as any stove of this kind. It is far superior in point of economy to the open fireplace, as ordinarily constructed, in which near seven-eighths of the heat evolved ascends the chimney and only one-eighth, or according to Rumford and Franklin, only one-fifteenth is radiated from the front of the fire into the room. It has to some extent the cheerful light of the open fire, to which habit and association have attached us, and the advantages of the latter, in opening broadly near the floor, and thus drawing in the colder air with the carbonic acid in the current which goes to sustain the combustion and ascend the large pipe of the stove.

Various plans have been proposed and adopted, to make the common stove, whether close or open, serviceable in warming pure air before it is thrown into the room. Mr. Woodbridge in his essay on school-houses, describes one as follows:—the stove is inclosed on three sides in a case of sheet iron, leaving a space of two or three inches beneath and around the stove, and as it rises around it becomes warmed before it enters the room at the top of the case. The case is movable so as to allow of the cleaning out of any dust which might collect between it and the stove. Mr. Palmer in his Manual for Teachers, secures the same object by conducting the air from without, into a passage which traverses the bottom of the stove five or six times before it enters the room, and thus becomes warm.

In Millar's *patent ventilating school-house stove* the air is conducted from without, into a chamber below the fire-plate, and after circulating through pipes around the fire, escapes into the room.

The best mode, however, at the same time of warming and ventilating a school-room, especially if it is large, is by pure air heated in a stove or furnace placed in the cellar or a room lower than the one to be warmed. No portion of the room, or the movements of the scholars, or the supervision of the teacher, are encumbered or interrupted by stove or pipe. The fire in such places can be maintained without noise and without throwing dust or smoke into the room. The offensive odors and impurities of burnt air, or rather of particles of vegetable or animal matter floating in the air, are not experienced. The heat can be conducted into the room at different points, and is thus diffused so as to secure a uniform summer temperature in every part of it. A room thus heated, even without any special arrangements for this object, will be tolerably well ventilated, for the constant influx of warm pure air into the room will force that which is already in it out at every crack and crevice, and thus reverse the process which is ordinarily going on in every school-room. By an opening or rather several small openings into the ceiling, or a flue, which in either case should connect with the outer air, the escape of the impure air will be more effectually secured.

Importance of uniform Temperature.]—But whatever may be the mode of warming adopted, whether by open fireplace, or grate, stove wood or coal, or furnace, the temperature of the room should be uniform, and of the proper degree in every part. Not a child should be exposed to sudden and extreme changes of temperature, or compelled when overheated, or at any time, to sit against an

Inlet of cold air, or, with cold feet. This last is a violation of an indispensable condition of health. To secure a uniform temperature, a thermometer will not only be convenient, but necessary. It cannot be ascertained, for different parts of a room or for thirty or forty persons, differently circumstanced as to heat or cold, or differently employed, some of whom are seated, some standing or changing their position from time to time, without some less variable and uncertain standard than the teacher's feelings. However anxious he may be to make every scholar comfortable, he cannot be conscious at all times of the differing circumstances in which they are placed. He is not exposed to the rush of cold air from a broken or loose window, or from cracks in the ceiling, or the floor. He is not roasted by a seat too near the stove. He is not liable to a stagnation of the blood in the feet from want of exercise or an inconvenient bench. Even though he were capable of thus sympathizing with them, the temperature of the room after the fire is thoroughly going, and the doors closed, may pass gradually from 65° to 70° without the change becoming perceptible. Now though we may breathe freely in such an atmosphere, gradually heated, we cannot pass into the open air 40° or 50° colder, as would be the case on most winter days, and much less receive a current of such air on a portion, and a sensitive portion of the body, without great danger. With a thermometer in the room, the beginning and progress of such a change would be indicated, and could be guarded against.

7. Seats and Desks for Scholars.

In the construction and arrangement of the seats and desks of a school-room, due regard should be had to the convenience, comfort and health of those who are to occupy them. To secure these objects, they should be made for the young and not for grown persons, and of varying heights, for children of different ages, from four years and under, to sixteen and upwards. They should be adapted to each other and the purposes for which they will be used, such as writing and ciphering, so as to prevent any awkward, inconvenient or unhealthy positions of the limbs, chest or spine. They should be easy of access, so that every scholar can go to and from his seat and change his position, and the teacher can approach each scholar and give the required attention and instruction, without disturbing any other person than the one concerned. They should be so arranged as to facilitate habits of attention, take away all temptation and encouragement to violate the rules of the school on the part of any scholar, and admit of the constant and complete supervision of the whole school by the teacher.

Seats.]—Each scholar should be furnished with a seat and desk, properly adapted to each other, as to height and distance, and of varying heights, (the seats from 9½ inches to 15½, with desks to correspond) for children of different age or size. The seat should be so made, that the feet of every child when properly seated, can *rest* on the floor, and the upper and lower part of the leg form a right-angle at the knee; and the back, whether separated from, or forming part of the adjoining desk behind, should recline to correspond with the natural curves of the spine and the shoulders. The seat should be made, as far as possible, like a convenient chair.

Desks.]—The desks for a single scholar should be, at least, two feet long (two and a half is better) by eighteen inches wide, with a shelf beneath for books, and an opening in the back side to receive a slate. The upper surface of the desk, except three or four inches of the most distant portion, should slope one inch in a foot. On the level portion, along the line of the slope, there should be a groove to prevent pens and pencils from rolling off, and an opening to receive an inkstand. The top of the inkstand should be on a level with the desk, and be covered by a metalic lid. The end pieces or supporters of the desk should be so made as to interfere as little as possible with sweeping.

If the desk is made to accommodate two scholars on one seat, a partition, extending from the floor for four or five inches above the surface of the desk, should separate them; and if possible they should belong to different classes, so that one will be in his seat while the other is at recitation.

Injurious Effects of Bad Seats and Desks.]—The desk should not be removed from the seat, either in distance or height, so far as to require the body, the neck, or the chest to be bent forward in a constrained manner, or the elbow or shoulder blades to be painfully elevated whenever the scholar is writing or ciphering. These last positions, to which so many children are forced by the badly constructed seats and desks of our ordinary school-houses, have led not unfrequently to distortions of the form, and particularly to spinal affections of the most distressing character. Such marked results are principally confined to females of delicate constitutions and studious and sedentary habits. While boys and young men engage in active exercise and sport during the recess and at the close of the school, and thus give relief to the overstrained and unnaturally applied muscles, and restore the spring or elasticity to the cushion-like substance which gives flexibility to the spinal column; girls exercise less in the open air, indulge but little in those sports which give variety of motions to the joints and muscles, and are confined to duties and studies which require their being seated out of school hours too much and too long at any one time.

The effects of the posture above described, in writing or ciphering, are increased and even induced by their being compelled to lean against the narrow edge of the writing desk, when their faces are turned towards the Teacher. This edge comes against the weakest portion of the back, and the inconvenience or pain forces those exposed to it to find relief by resting the elbows on the desk, and thus giving an unnatural elevation to the shoulder-blades—or if no support of the kind is provided, they lean against each other, support the back by closing the hands over the knee, or resort to some other awkward or unnatural position, which if long continued will cause more or less of structural deviation, amounting not unfrequently to positive disease or deformity.

Dr. Woodward, in a communication appended to Mr. Mann's Report, remarks:—"High and narrow seats are not only extremely uncomfortable for the young scholar, tending constantly to make him restless and noisy, disturbing his temper and preventing his attention to his books; but they have also a direct tendency to produce deformity of his limbs. As the limbs of children are pliable or flexible, they are made to grow out of shape by such awkward and unnatural positions.

"Seats without backs have an equally unfavorable influence upon the spinal column. If no rest is afforded the backs of children while seated, they almost necessarily assume a bent and crooked position. Such a position often assumed and long continued, tends to that deformity which has become extremely common with children in modern times; and leads to diseases of the spine in innumerable instances, especially with delicate female children."

Dr. J. V. C. Smith, of Boston, in his Anatomical Class Book, says:—"There is a radical defect in the seats of our school-rooms. Malformation of the bones, narrow chests, coughs ending in consumption and death in middle life, besides a multitude of minor ills, have often had their origin in the school-room." Again, "To these wretched articles, viz. badly constructed seats and writing desks, are we to look in some measure for the cause of so many distortions of the bones, spinal diseases, chronic affections now so prevalent throughout the country."

Dr. Warren in his admirable lecture before the American Institute of Instruction, which should be in the hand of every teacher and parent, says:—In the course of my observation, I have been able to satisfy myself that about one half the young females brought up as they are at present, undergo some visible and obvious change of structure; that a considerable number are the subjects of great and permanent deviations, and that not a few entirely lose their health from the manner in which they are reared." And among the causes which lead to such mournful results, he enumerates the unnatural elevation of the right shoulder, the habit of bending the neck, and the stooping posture of the body when engaged in writing, or similar exercises at school.

Frequent change of Position necessary.]—No position, if long continued, is more irksome or more unhealthy, or at least operates so insidiously, and yet directly to derange the circulation and other vital functions, as sitting, especially upright, or with the neck and chest bent forward. To young children, it is cruel in the extreme, and wars directly with all healthy and symmetrical growth, besides ruining the temper, and imparting a lasting distaste to study, the school-room, and the teacher.

Little children are made to suffer, and many of them permanently,

and from being forced to sit long in one position, without any occupation for mind or muscles, on seats without backs and so high that their feet cannot touch, much less rest on the floor. Nothing but the fear of punishment, or its frequent application, can keep a lively child still under such circumstances, and even that cannot do it long. Who has not an aching remembrance of the torture of this unnatural confinement, and the burning sense of injustice, for punishment inflicted for some unavoidable manifestation of uneasiness and pain! Even though the seats are as comfortable as can be made, young children cannot and should not be kept still upon them long at a time, and never without something innocent or useful to do, and under no circumstances, longer than twenty-five or thirty minutes in one position, nor so long at one study, and that with frequent and free exercise in the open air. To accomplish this, great and radical changes in the views and practice of teachers, parents and the community must take place. No where, in the whole department of practical education, is a gradual change more needed, or should be sooner commenced.

School-houses of one Room.]—If school-houses are to consist of but one room for all the children, regard must be had to the varying circumstances of the winter and summer school. In the former, the larger and older children predominate, and in the latter, the younger and smaller, and yet in both, the younger and smaller are sadly neglected, not only in matters of instruction, but in physical comfort. In summer, they, or at least a portion of them, are seated "beyond soundings," on seats intended and occupied by the older scholars in winter; and in winter, they are packed away on smooth, high, backless slabs, and in a roasting proximity to the fire. Now there is no way of remedying this state of things, but by having a school-room large enough to accommodate all who may attend, and to have seats and appropriate desks for all the children, be they young or old, large or small. In the winter, let so many of the seats and desks for the smaller children as are not wanted be removed to the attic, or the wood-room, and their places supplied by some for the older, and in the summer let this arrangement be reversed.

School-houses of two Rooms.]—The most effectual way of securing appropriate accommodations for children of different age and size, is to have two or more school-rooms, one of which shall be for the younger, and be fitted up accordingly. At one end, with no windows in the wall, should be a platform of seats rising one above the other, on which the children can be arranged at suitable times, for inspection as to cleanliness, for manual exercise, and for all simultaneous exercises, such as singing, simple operations of mental arithmetic, reading of scriptural and other moral stories, and lessons on real objects, pictures and other visible illustrations. The gallery is an economical arrangement in respect to space and expense, and enables the children to fix their eye more easily on the teacher, and the teacher to observe, explain, be heard, and direct more perfectly every movement of the children, and both teacher and children, to profit by the great principle of social sympathy, and imitation.

Physical exercises.]—Whatever may be the intellectual and moral exercises of schools for small children, they should be varied and in such a manner as to require frequent and varied physical movements—both change of position and place, from sitting to standing, from desk to gallery, marching, clapping of hands, and other exercises of the joints and muscles which shall bring them all into play, singing, &c. Even with this diversity of occupation in doors, young children, whose healthy and symmetrical growth is governed by the great laws of constant and cheerful motion, require gamboling, frolicsome exercises for ten or fifteen minutes, as often as every hour they are mentally occupied, in the open air, if it is pleasant, or in the woodshed or other covered building, in damp or rainy weather. A play-ground, safe from all exposure of the health and limbs of children, large enough to allow of trundling the hoop, and of free exercise of the limbs, supplied with a circular swing, &c., is an indispensable appendage to a school where children are to be reared with vigorous and symmetrical bodies.

8. Arrangements for Teacher.

The arrangements for the teacher should be such, that he can survey the whole school at a glance, address his instruction, when necessary, to the whole school, approach each scholar in his seat without incommoding any other, and conduct the recitations most conveniently to himself, and with the least interference with the study of the school.

With this view, his seat and desk should be placed in front of the school on a raised platform; the aisles should be so arranged as to separate each range of the scholars' seats; and an open space, or appropriate seats, should be provided for the reciting classes, in front of the side of his desk.

The teacher's desk should be sufficiently large, and appropriately fitted up, to accommodate the books of reference and apparatus.

The recitation room, or place for recitation, wherever it may be, should be furnished with blackboards, stands for hanging maps and diagrams, and all appropriate apparatus.

The teacher should not, however, occupy any one position permanently, or the mischievous scholars will shape their devices for concealment accordingly, and a position in the rear of the school, except for convenience in recitation, is better calculated to detect than prevent transgression. The eye of the teacher, that great instrument of moral discipline, cannot invite confidence, or meet the answering confidence of the pupil.

9. Apparatus.

No school room can be considered complete which is not provided with such fixtures, and means of visible illustration, as will aid the teacher in cultivating in his pupils, habits of correct observation, comparison, and classification, and in making the knowledge communicated by books orally, accurate, vivid, and practical.

One blackboard, at least, is indispensably necessary. This should be so placed, as to be easily accessible, and in full view of the whole school. The larger it is, the more useful it can be made. The board should be free from knots, or cracks, well seasoned, smoothly planed, and then rubbed with sand-paper, and painted black, without varnish. On the lower side should be placed a trough to receive the chalk or crayon, tin or brass holders, (called port-crayons) a rubber of cloth, wash-leather, or sponge. If the board is broad, or in two or more parts, it should be kept from warping or opening by cleates of iron or wood on the back side or ends.

If there is but one blackboard, it should be movable, so as to be used in different parts of the room. For this purpose, it must be suspended on hooks, or rings inserted in the upper edge, or what is better, on a moveable frame, like the painter's easel. It is better, and will add but little to the expense, to provide, in addition to the large one, directly back of the teacher, two or three smaller and portable ones. Every recitation room should be lined with blackboards.

Each desk should be furnished with a slate, pencil holder and sponge. *A slate to every scholar, young or old, is, if possible, more necessary than a blackboard.* It is a miserable economy to withhold slates from children on account of their liability to be broken. The saving in the wear and tear of books, effected by the use of slates, will more than pay for the latter, especially if they are set in a good oak frame, fastened tightly around the corners by a band of sheet iron, or even by cord or wire. The iron or wire, if used, should not project beyond the surface of the frame, or it will scratch the desk. The most appropriate place for the slate is an opening in the backside of the desk. The pencil holder can be made of brass or tin, about the size of a quill, with two slits at the end into which a short piece of pencil can be put. Without such a holder, no child should be allowed to use a short pencil. He will immediately acquire the habit of contracting his fingers around it, so as to unfit himself for holding a pen properly. If pencil holders are not provided, a long pencil should be, and the brittleness of the common slate pencil can be obviated by rolling it up in strong paper covered with paste. When dry, the paper and pencil can be shaped like an ordinary lead pencil.

With the blackboard and slate, there is no study from the simplest rudiments up to the highest department of science which cannot be illustrated and taught to better advantage, than without them, while there are some to whose attainment they are absolutely indispensable. It is painful to go into our schools, and see how many little children are trying to sit still, with no occupation for the hands, the eye, or the mind, who might be innocently and usefully employed, in a sand desk, or with a slate and pencil, in printing the alphabet,

combining letters, syllables, or words, copying the outlines of angles, circles, solids, or maps, diagrams, real objects; thus acquiring knowledge as well as correctness of eye and rapidity of hand, which will be of great use afterwards in learning to write and draw with the pen on paper. It will be found invariably that children, who begin early with the use of the slate, and the blackboard, in writing, drawing, spelling, arithmetic, grammar, are more accurate, rapid and practical scholars than others much older and with better opportunities in other respects, who have not been accustomed to their use. The above articles of apparatus may be considered indispensable, and should not be left to the chance supply of parents. But there are other means in training the senses and forming correct elementary ideas which should be provided as far as practicable.

A *clock*, which strikes at stated intervals, is indispensable to a just distribution of the teacher's time and attention among the various classes and studies of the school, and may be made highly useful in imparting a correct elementary knowledge of the comparative lengths of different portions of time, from a second to a century, and so of the chronology of the human race.

The *measure* of an inch, foot, yard, and rod, marked off on the edge of the blackboard, will give a correct and visible standard of distance, to which all statements, or references in the lessons can be brought to the test.

The *cardinal points* accurately ascertained by the compass, painted on the ceiling, or on the teacher's platform, and associated by frequent references of the teacher, with the parts of the heavens in which the sun rises and sets, will be of incalculable service in the study of geography. In this connection, and as introductory to drawing, plans of the school-house, playground, village-green, district, town, and county, will lead children to an accurate conception of states, continents, the earth, and the system of which it forms a part. The ideas connected with the subjects last named, cannot be properly understood without a globe, tellurium, orrery and similar apparatus.

Counters, or flat pieces of wood about an inch long and half an inch wide, a numeral frame, real measures of every kind, linear, superficial, solid and liquid, weights, models, and diagrams of the geometrical forms, and solids,—articles which the pupil can touch, see, examine, experiment with, copy on the slate or blackboard, will prove invaluable helps in teaching children to form correct elementary ideas of number, size, distance, form, and measurement.

The *study of geography and history* can be made far more useful and interesting by *pictures* representing the great curiosities of nature and art, views of cities, and other places memorable for great events, the manners, dress, edifices, ruins, &c., peculiar to each country. One set of plates could answer very well for all the schools of a society or town, and pass in succession through the several districts.

For the *study of the natural sciences*, and there is no study which can be made more useful or delightful in the hands of a judicious teacher, cheap collections of minerals, and specimens or drawings of plants and animals, would not only be useful but necessary. In this department the children could collect their own cabinets, and an interchange of specimens between the different districts and towns to be effected. Some of the hot days of summer had better be spent in the fields, or the woods, in search of the beautiful things which God has scattered over the earth and through it, with a teacher, who has a taste for natural science, than in the hot, unshaded school house of many districts.

The *Magic Lantern* in almost any of its improved forms, and especially in Carpenter's, is accompanied with diagrams to illustrate astronomy, natural history, cities, landscapes, costumes, &c., which bring the objects and truths represented so vividly before the young, that they never can forget them.

The inefficiency of school education of every name, is mainly owing to the want of such cheap and simple aids as have been briefly alluded to above, and of methods of instruction based upon, and adapted to them, begun early and continued throughout the whole course. Hence much of the knowledge of early life is forgotten, and more of it lies in dead, useless, unassimilated masses, in the memory. It does not originate, or mould, or color the meditations of the closet, and is not felt in the labour of the field, the workshop, or any of the departments of practical life. The knowledge then found available is the result of self-education, the education attained after leaving school by observation, experience and reading. Under any opportunities of school education, this self-education must be the main reliance, and the great object of all regular school arragements should be to wake up the spirit, and begin the work of self-culture as early and widely as possible.

10. Library.

The school-house is the appropriate depository of the district library, and a library of well selected books, open to the teacher, children, and adults generally of the district, for reference and reading, gives completeness to the permament means of school and self-education, which can be embraced in the arrangement of a school-room.

The teacher should be able to extend his own acquaintance with the studies pursued, and to illustrate and explain any name, date, event, terms of art or science, or other allusion or question which might occur in the regular lesson, or which the natural curiosity of children, if encouraged, would suggest. Above all should he be furnished with *the best books which have been published on education*, and especially with that class which have special reference to the duties and labours of the school-room, and have been prepared by experienced and successful teachers.

Children, even the youngest, should be provided with such books, adapted to their age and capacity, as will invest their studies with new interest, help them to observe and understand what they see and hear by the roadside, in the field, and in their daily conversations, and form a high standard to aim at in manners, morals, and intellectual attainments. Many an idle hour would thus be redeemed, and the process of self-culture be commenced, which would go on long after their school-life was ended.

The farmer, mechanic, manufacturer, and, in fine, all the inhabitants of the district, of both sexes, and in every condition and employment of life, should have books which will shed light and dignity on their several vocations, help them better to understand the history and condition of the world, and country in which they live, their own nature, and their relations and duties to society, themselves and their Creator. All that is wanted to fill the community with diligent and profitable readers among all classes, is to gratify the natural curiosity of every child "to know," to convert that curiosity into a well regulated taste, and confirm that taste into a habit, by easy access to a library of appropriate books.

Without such books the instruction of the school-room does not become practically useful, and the art of printing is not made available to the poor as well as the rich. The rich can always command more or less of the valuable works which the teeming press of the day is throwing off, but the poor must depend for their reading, on such books as public libraries, easily accessible, or the benevolence of more favored individuals may supply.

Wherever such libraries have existed, especially in connection with the advantages of superior schools, and an educated ministry, they have called forth talent and virtue, which would otherwise have been buried in poverty and ignorance, to elevate, bless, and purify society. The establishment of a library in every school-house, will bring the mighty instrument of good books to act more directly and more broadly on the entire population of a state, than it has ever yet done, for it will open the fountains of knowledge without money, and without price, to the humble and elevated, the poor and the rich.

11. Yard and External Arrangements.

The external arrangement of a school-house, as connected with its attractiveness and convenience, and the health, manners, morals, love of study and proficiency of the pupils, must not be overlooked.

The building should not only be located on a dry, healthy, and pleasant site, but be surrounded by a yard, of never less than half an acre, protected by a neat and substantial inclosure. This yard should be large enough in front, for all to occupy in common for recreation and sport, and planted with oaks, elms, maples, and other shady trees, tastefully arranged in groups, and around the sides. In the rear of the building, it should be divided by a high, and close fence, and one portion, appropriately fitted up, should be assigned exclusively for the use of the boys, and the other, for the girls. Over this entire arrangement, the most perfect neatness, seclusion,

order, and propriety should be enforced, and every thing calculated to defile the mind, or wound the delicacy or the modesty of the most sensitive, should receive attention in private, and be made a matter of private advice and co-operation.

In the cities and populous districts, particular attention should be paid to the play-ground, as connected with the physical education of children. In the best conducted schools, the playground is now regarded as the *uncovered* school-room, where the real dispositions, and habits of the pupils are more palpably developed, and can be more wisely trained, than under the restraint of an ordinary school-room. These grounds are provided with circular swings, and are large enough for various athletic games. To protect the children in their sports in inclement weather, in some places, the school-house is built on piers; in others, the basement story is properly fitted up, and thrown open as a play-ground; and in others, the wood, or coal shed is built large for that purpose. Under any circumstances the school-room should not be used for any other than purposes of study and conversation.

An appropriate place for fuel should be provided, which it may be well to remark, should be supplied of the right quality, in proper quantity, in due season, and in the right condition for being used.

Every school-house should have its own well, with suitable arrangements for drink, and for the *cleanliness of the pupils.*

A bell is always found an essential help in securing punctual attendance, and determining when the time of recess begins and ends.

For the Journal of Education.

SCHOOLS OF ART OR PRACTICAL KNOWLEDGE—SYNOPSIS OF A COURSE OF INSTRUCTION.

By H. Y. Hind, Esq., *Mathematical Master and Lecturer in Chemistry and Natural Philosophy in the Normal School for Upper Canada.*

The industrial history of ancient nations is well adapted to draw expressions of astonishment from the lips of men of modern times. That history does not teem with the records of brilliant discoveries in physical science; but it abounds with magnificent illustrations of the successful application of a few important principles in carrying out the suggestions of vast original conception and refined taste.

The industrial history of the Greeks is a subject well worthy of careful study. If we compare the attainments of that enterprising people in the fine and industrial arts with the productions of modern skill, we shall be able to form a just opinion respecting the nature and extent of the progress which has been made during the lapse of more than two thousand years.

The application of mechanical power has been infinitely varied and extended since Athens was the centre of artistic skill and fame. New combinations of power have been invented and new properties of matter developed, through which the difficulties of former days have not only been materially lessened, but also the requirements of talent, skill and taste in the workman, superseded by the unfailing accuracy of an apparently intelligent machine, or blind devotion to empirical rules.

We regard with astonishment and admiration those stupendous ruins of temples, baths, monuments, aqueducts, and pyramids, which so strikingly attest the mechanical skill and energy of the Greeks, Romans, and Egyptians; and we are constrained to acknowledge the greatness of that enterprise and genius which could raise such magnificent structures, possessing, as we suppose their architects to have done, but a limited acquaintance with the agents for producing mechanical power.

The discovery of some unknown principle in science marked a new era in the industrial history of nations; nor was such discovery the result of chance or idle speculation, but the well-earned reward of powerful and intense thought, occupying itself in endeavouring to deduce a principle from a mass of accidental and unclassified combinations. Many applications of mechanical principles which, in the present state of our knowledge, appear to us extremely simple and obvious, are nevertheless of modern invention, and were in part or altogether unknown to the skilful and enterprising artizans of Greece and Rome. Wind-mills, water-mills, saw-mills, and pumps, common and necessary machines now-a-days in every city, town, and village, are all of comparatively modern date; and scarcely one century has elapsed since the application of the fundamental principle of the equilibrium of fluids, to convey water from one locality to another, superseded the construction of those costly aqueducts the Romans have left behind them in every country where they flourished. Though to a great extent destitute of what we now term the conveniencies and even necessaries of life, ("for the tendency of civilization is to convert luxuries into necessaries,") yet in tasteful manufactures, and in beautiful specimens of the fine arts, they frequently equalled and often surpassed us; for as long as elegance of design and delicacy of workmanship depended upon the artizan, their productions present us a type of correct taste, conjointly with the acquirements of unequalled manual dexterity and ingenuity. "Their tables, seats, lamps, pedestals, couches, drinking vessels, with the thousand accessaries of refined and luxurious taste, were not fashioned in any set mould, or after any set pattern, but, as we know, were continually assuming novel forms of elegance and beauty. Can we hesitate to attribute such results to the daily and hourly teaching of that great home, rather than school of design, amidst whose magnificent forms the artizans of Athens lived and toiled? Their eyes were familiarized from boyhood to the sight of an infinite variety of graceful outline, perfect harmony, and exquisite proportion; all this which in our obtuse days is the rare accomplishment of a connoisseur, or of our workman in a thousand, came to the craftsmen of Attica imperceptibly—they, doubtless, scarce knew how." But blind dependance on the accurate working of a machine, and implicit faith in those processes which accident or acute sagacity have discovered, too often convert the practical man of the present day, into a mere mechanical assistant of the inanimate being or agent whose operations he is designed to superintend and control. The spirit of originality and design is absorbed in a patient reliance on automata, or remains inert, because the practical man is destitute of a knowledge of fundamental principles. Those principles are known only to a comparatively limited class of the community; the door of improvement is thus closed to those who have the best opportunity of detecting imperfections and suggesting improvements.

The artizan, the manufacturer, the mechanic, of the present day, is placed in a position widely different from that of his compeers even two hundred years ago. He must either continue a sightless follower of empirical rules, or make himself acquainted with the rationale of those multitudinous processes he is obliged to adopt, in order to arrive at the result of which he is in quest. He is a competitor among hundreds of thousands of others for the suffrages of his fellow men, and the secret of his success lies in the circumstance of his being able to produce the best article at the least possible remunerating price. It matters not in what particular occupation he is engaged, Science is continually suggesting new and effectual modes of accomplishing certain results, by methods superior to those which last engaged his attention. But who ought to be more capable of facilitating processes and adding to the inventions and discoveries of the day in any particular branch of industry, than they whose days are occupied with the minutiæ of the operations themselves?

The history of the industrial arts presents us with a satisfactory answer to this question; for, in nine cases out of ten, we discover the names of men of humble social rank, preëminently associated with the numerous inventions and practical applications of theoretical principles which have benefited mankind. How frequently do we find the sanguine expectations of the mere theorist terminate in disappointment, because he is unacquainted with practical difficulties, which it is impossible to foresee; and how much more frequently have we cause to lament the waste of capital, time, and labor, in public and private enterprise, which frequently results from the ignorance and inefficiency of those appointed to superintend the requisite operations! What remedy has been suggested capable of removing the evils induced by this condition of things? What means provided to restore originality to its real home, where it has been so long a stranger, or appeared at intervals few in number and far between? It is to favor the intellectual elevation of the mechanic and artizan, that their minds may keep pace with the improvements of the age; that they may no longer continue to

labour in doubt and gloom; but, clearly comprehending the reason of every combination and process employed, be alive to the value of suggestions from others, and, what is still more important, acquire the power of originating serviceable suggestions themselves. It is further to prepare, by special instruction, the manufacturer, the builder, the surveyor, the machinist, the engineer, the practical man, &c., for the proper and effectual performance of their varied and extensive occupations.

Drawing its character from the growing conviction in men's minds, of necessity for using every reasonable endeavour to accomplish the removal of evils like those to which allusion has just been made, the industrial history of modern times is being distinguished by records of the uprising of thousands of institutions devoted to the improvement of the intellectual condition of artizans and mechanics, and to the special preparation of the manufacturer, the builder, the shipwright, the machinist, the surveyor, the engineer, in a word, the practical man, for their respective professional duties.

Mechanics' Institutes in Great Britain have been the pioneers of culture in these untilled and unsown fields of fertile soil. The elastic nature of Mechanics' Institutes is eminently adapted to accommodate the knowledge, of which they are the well-spring, to the requirements of their associated elements, and to progress in the means of giving information, in a ratio, dependant upon the wants and desires of those by whom they are created and supported.

The Mechanics' Institutes in large towns in the Mother Country differ widely at the present time from what they were ten years ago. In Manchester, Liverpool, London, Edinburgh, Glasgow, and hundreds of other localities, they have assumed the forms and character of giant popular schools of philosophy and science. From the diffusion of elementary and desultory information, designed rather to infuse a desire for knowledge than to inculcate its principles, they have advanced to a maturity which enables them to vie with collegiate establishments, in the comprehensive nature of the subjects which engage their attention, the mode in which those subjects are introduced, and in their apparatus for illustration. Their influence is further extended by associating with them schools of design, and subsidiary departments for special elementary instruction in various branches of a civil and polite education.

In Mechanics' Institutes, and their adjuncts of schools of design and subsidiary departments, we discover the progress in Britain of that conviction which has led men to use every endeavour to infuse into the minds of the working mechanic and artizans, a knowledge of fundamental principles. One grand step in the march of intellectual and consequently practical improvement thus taken, gave an impulse to others of a more important character, and the special training of the manufacturer, the engineer, the practical chemist, the shipright, the master-mechanic, the tradesman, &c., &c., soon became a question of yearly increasing importance. Germany early set the example in providing instruction in these departments of practical knowledge. France, Switzerland, Belgium, Holland, Great Britain and Ireland, Russia, and America, sooner or later followed in her steps, and at the present time the industrial history of nations records the establishment and existence of hundreds of such institutions; Schools of Art, or Schools of Practical Knowledge, as they are called, whose influence upon the manufacturing and commercial prosperity of those countries in which they have been established, has surpassed the expectations of their most enthusiastic promoters. The plan of instruction pursued in these seminaries is dependant in some measure on their geographical position. Those in Germany, for instance, which are situated in towns remote from the sea, and in the centre of particular manufacturing districts, give special attention to the theory and practice of manufacturing processes; others, at the sea-board, make naval architecture, naval engineering, floatation, &c., prominent subjects of instruction. And, in the central or head schools, the course of instruction comprehends the theory and practice of all important mechanical and chemical processes in manufactures,—the principles of engineering, the construction of edifices, bridges, &c.; civil and naval architecture, natural history, and natural philosophy, generally.

The manner in which the various subjects comprising a course of instruction in these seminaries are treated, constitutes their most important feature. The one object in view is to associate as much as possible the science with the art, from the investigation of principles, whether of arithmetic, algebra, mechanics, or chemistry; to proceed to the practical application of those principles: to substitute, as far as possible, general formulæ for arbitrary rules, and to make those formulæ subjects of special investigation.

An eminent writer of the present day, Augustus de Morgan, in speaking of professional mathematics, remarks: "Generally speaking, a common school education is all the training undergone by those who are to be engineers, &c. The quantum of mathematical knowledge thus acquired passes current under the names of arithmetic, algebra, geometry, and plane trigonometry: the portion of physical information is generally that known in numeration by the symbol 0. Considered with reference to their future wants, this sort of education is neither theory nor application of theory." And further, in alluding to the system almost universally adopted in the treatises on arithmetic, algebra, and mensuration, which are put into the hands of students, he observes: "As it is, we speak from experience when we say that the special character of the rules which are taught prevents any application except to objects which are spelt in the same way as in the book, and that we are confident many students who can take 7½ per cent. of pounds, shillings, and pence, would be unable to do the same thing with a beam of wood measured in feet and inches."

The investigation and application of formulæ, in place of learning rules by rote, is not only calculated to give a clear and correct idea of the rationale of the processes employed, but it serves also to convert a mechanical operation into an admirable exercise of the mind, and at the same time to place in the hands of the student a *general* method of discovering modes by which all questions involving arithmetical, simple algebraical, or mechanical principles, may be solved with comparative facility.

In the subjoined synopsis of the course of study pursued in a School of Arts and Design, it will be remarked that special attention is given to the practical application of theoretical principles, and that the investigation of formulæ constitutes an important element in the plan of instruction, which is in accordance with the method pursued in the central Schools of Practical Knowledge now flourishing in many parts of the continent of Europe.

The subjects embraced in the first and second year would, probably, with a few modifications, be regarded as embracing a course of instruction sufficiently comprehensive for the requirements of students in Canada. It is to be remembered, however, that the education of those who are about to become practical engineers, too frequently stops short at the very door of improvement, at the very time when they are about to grasp that powerful instrument of investigation, the Differential Calculus, which in its application to physical science, is best adapted to test the value of original conceptions, of leading, through confidence in its decisions, to their practical application, or causing them to be rejected as insecure or unsound.

Synopsis of the Course of Study pursued in a School of Art and Design.

First Year.

(Commencing at some stated period of time fixed by the authorities of the Institution, after which no pupils are allowed to enter the classes. Pupils are admitted at the age of fourteen years; they are supposed to be acquainted with the grammatical structure of their mother tongue, to be capable of writing it with ease and correctness, to possess a knowledge of Commercial Arithmetic and of Geography. Previous to admission, they are subjected to examination in the above branches of Education, and any others, with the elements of which they may have made themselves acquainted. According to the results of that examination, they take their places in the first or second section of the class formed by the new-comers. It sometimes happens that pupils desiring admission are found, upon examination, to be so far advanced as to entitle them to enter at once into the second-year class. A favour granted, however, with reluctance.)

1. Science and Practice of Arithmetic, with the use of Logarithmic tables.
2. Pure Mathematics, comprehending Algebra as far as the theory of Equations; Geometry; (Plane Trigonometry.)*
3. Practical Mathematics. Mensuration of regular and irregular surfaces, of solids, (of heights and distances) Mathematical Formulæ.

* Subsidiary branches of Instruction, introduced in a parenthetical form, are frequently not embraced until the succeeding year.

4. Elementary Mechanics,—illustrated by Models of the Mechanical Powers and of their Combinations. Simple Machines for the purpose of exhibiting the various modes practised of changing the direction of a force, and its application to produce certain effects.
5. Elementary Analytical Mechanics; being the investigation of simple Mathematical formulæ for computing the effects produced by the combination of Mechanical powers. Parallelogram of Forces. Elementary Mechanical Problems.
6. Linear Drawing.
7. Themes. Descriptive Composition.
   (The Lecturer having described the various functions of the separate parts of a mechanical contrivance, requires the pupils to write an accurate description of what he has been illustrating; these themes, of which the subject is continually increasing in difficulty, are preserved by the pupil, and at the end of the year, being neatly bound together, are subjected to public inspection.)
8. Outlines of General History.
9. Elementary Botany and Vegetable Physiology. Comprehending the geographical distribution of Plants. Description and Geography of Vegetables used in the Arts. Classification of Vegetables;—1st. Into those applicable for food; 2nd. Clothing; 3rd. The Arts, Dyeing, &c.; 4th. Building; 5th. Ornamental Work; 6th. Medicine, Poisons, &c. The whole illustrated by specimens of vegetable production in their natural or raw state.
10. Elementary Comparative Anatomy.
11. Elementary Zoology. Mineralogy, illustrated by specimens of Minerals, &c.
12. Elements of Natural Philosophy.
14. Inorganic Chemistry.

Second Year.

1. Pure Mathematics continued. Algebra to theory of Equations. Conic Sections, (Geometry of two dimensions.) Analytical Trigonometry.
2. Practical Mathematics continued. Surveying. Mensuration. Mathematical Formulæ.
3. Analytical Mechanics continued. Equilibrium of Bridges, Roofs, Terraces, Domes, &c. Strength of Materials. Rigidity of Cordage. Friction. Regulation of Variable Movers. Fly Wheel. Governor. Investigation of Mathematical formulæ. Dynamics. Fundamental Equations of Motion. Gravity. Pendulum. Centre of Oscillation, Gyration, &c.
4. Practical Mechanics. Construction of Machinery. Maximum effect of Machines. The Tread-Mill, the Lathe, the Steam Engine, &c. &c.
5. Hydrostatics and Hydrodynamics. Equilibrium of Fluids. Floatation. Elastic Fluids. Motion of fluids through pipes and orifices. Resistance of fluids. Bramah's Press. Pumps. Archimedes' Screw. Conduit Pipes. Barometer. Condenser, &c. &c. Investigation of Formulæ.
6. The Steam Engine.
7. Engineering. Surveying. Levelling. Instruments used. Construction of Edifices, Arches, Piers, Bridges, Mill-dams, Harbors, Docks, &c. Draining, Sinking of Shafts, Mining, Artesian Wells, &c.
8. Practical Science. Special Instruction in the application and selection of Machinery. Rationale of the Mechanical and Chemical Processes used in the Arts:—1st. Dyeing; 2nd. Bleaching; 3rd. Brewing; 4th. Baking; 5th. Sugar Refining; 6th. Calico Printing; 7th. Assaying; 8th. Distilation; 9th. Tanning, &c. Manufactures of Flax, Cotton, Silk, Wool. Manufacture of Glass, of Paper, of Ropes, of Dyes, of Soap, of Starch, of Gums, of Caouchouc, of Stearine Candles, of Chemicals, of Pottery, &c. Art of Printing, Gilding, Working in Metals, &c. Manufacture of Textile Fabrics, of Carriages. Metallurgy. Mining operations, Lighting, &c.
9. Astronomy continued.
10. Elementary Instruction in Navigation.
11. Botany. Zoology continued.
12. Chemistry continued. Quantitative and Qualitative Analysis. Fermentation. Combustion. Ventilation. Poisons, &c. Outlines of Agricultural Chemistry.
13. Natural Philosophy continued.
14. Geology and Mineralogy continued.
15. Elements of Particular History.
16. Human Physiology.
17. Linear Drawing continued—From Models.
18. Descriptive Composition continued.

Third Year.

(If the pupils are not sufficiently advanced in the studies of the second year, they continue one year longer in the second year class.)

1. Pure Mathematics. (Geometry of three dimensions.) Elements of Differential and Integral Calculus. Spherical Trigonometry.
2. Practical Mathematics. Application of Differential and Integral Calculus to Physical Science. Stereographic Projections. Construction of Charts, Maps, &c. Construction of Mathematical Tables.
3. Geodetic Surveying.
4. Engineering continued.
5. Human Physiology continued.
6. Experimental Chemistry, organic and inorganic. Experimental Natural Philosophy.
7. Linear Drawing continued. Plans and Designs of Edifices. Draughting.
8. Naval Architecture.
9. Forest Technology.
10. Political Economy.
11. Statistics.
12. History of the Industrial Arts.
13. History of the Inductive Sciences.

To Correspondents.—*We shall be happy to give* Mr. Kivas Tully's *communication on* Ventilation *a place in our next number. We will also readily insert his further proposed remarks on the same subject.*

JOURNAL OF EDUCATION.

TORONTO, MARCH, 1849.

For acknowledgments and various Editorial notices, see last page.

Journal of Education.—We earnestly hope that the favourable opinions expressed by correspondents and others in different parts of the Province, respecting the Journal of Education, will be followed by corresponding exertions to increase its circulation as widely as possible.

☞ *For the Government Bill to establish a Common School Fund of* £100,000 *per annum,* see page 42; and for a short account of the proceedings which took place on the introduction of this important and valuable measure into the Legislative Assembly, see page 46, under the head of *Educational Intelligence.*

COMMON SCHOOL LAW OF UPPER CANADA.

The history of legislation in all educating countries shows, that of all legislation that which relates to elementary education is the most difficult. In several of the neighbouring States, we observe that their school laws are already nearly as numerous as the sections of the Common School Law of Upper Canada. Their mode of school legislation seems to be very judicious—passing short acts from year to year to remedy practical defects or to supply new wants in their school system, and then, after a few years, revise and embody all the useful provisions of their short acts into one general statute.

The present Common School Statute of Upper Canada has been in operation a little more than two years; during which time it has been subjected to an ordeal of unparalleled severity. What is the result of practical experience in the judgment of that part of the community who are favourable to a public system of elementary education, and are anxious to render it as efficient and useful as possible, may be inferred not only from the entire silence of nine-tenths of the District Councils, at their recent sessions on the subject, but from the statements of persons in different Districts having the best means of information. In the Report of the Education Committee of the Home District Council, adopted at its late session, the low condition of the Common Schools in that District is attributed to the want of efficient local supervision, the want of local information and enterprise, and the want of proper qualifications in School Teachers—increased by the provision of the School law

which authorizes School Visitors to give certificates of qualification, and prohibits the qualification of *aliens* as Teachers. These are the only provisions of the School law objected to by the present Home District Council. In the report of the Rev. Wm. Clarke, (Congregational Clergyman,) Superintendent of Common Schools in the Talbot District, addressed to the Council at its recent sittings, we find the following remarks on the working of the School law :—

"Perhaps you will allow me to say, from personal observation and extensive intercourse, that there is a very general satisfaction with the leading provisions of the present law; while, at the same time, there is an almost unanimous desire for some alterations and amendments.

"The most active and energetic promoters of Education are very desirous that the present Rate-bill should be abolished; and that the additional amount of the Teachers' salary should be raised either by an uniform Rate-bill upon all the children, whether in attendance at school or not; or that the whole amount for school purposes should be raised by the assessment of property, which should not only be taxed for the protection of all, but for the education of all. I have seldom met with an intelligent Trustee who has not uniformly condemned the present mode, and expressed a desire that it might be superseded by a more excellent one. Then it is also desirable that the power of Trustees should be somewhat enlarged. Great care however should be taken, that all moneys coming into their hands may be faithfully applied, and duly accounted for. I would further suggest the propriety of a more equitable distribution of the school money. The present system provides, that each section shall receive a sum in proportion to the number of children residing within its bounds, without any reference to the number in attendance, or the length of time the school may be open. I might point you to two sections, where the number of children is equal, and of course the amount is equal also, but in one of these sections the children attend school all the year round, while in the other only one-half attend, and that for only six months in the year.

"Your Hon. Body will perceive at once that some principle should be applied, perhaps by rendering aid from the school in proportion to the efforts actually put forth by the inhabitants themselves, thus giving encouragement to those who are in actual attendance, and withholding it from those who, through ignorance or indifference, do not avail themselves of the advantages they may enjoy."

The Rev. W. H. Landon, (Baptist Clergyman,) Superintendent of Common Schools in the Brock District, in a Report printed by special order of the Council, remarks as follows, on the present School law :—

"The effect of our present school system (though in several respects imperfect) has doubtless been to double the number of schools, while the pupils in attendance, and the amount of instruction given, have been augmented in a much greater proportion. An increasing disposition is manifested on the part of the people to employ a higher class of Teachers, and to give them reasonable salaries; and by means of the Provincial Normal School such Teachers are being multiplied; and shortly, it is reasonable to expect, the influence and value of right instruction on right principles will be extensively perceived throughout the Country.

"Having taken much pains to ascertain what the views of the people are on the subject, I venture to assert that the School Law is not unpopular; but, on the contrary, the people almost unanimously regard it as the greatest boon ever bestowed by the Legislature upon the people of this Country. They are, however, equally unanimous in the opinion that it is susceptible of several improvements, and that some amendments are absolutely necessary. I trust your Honorable Council will not think me exceeding the duties of the office with which I have the honor to be entrusted by your suffrages, if I proceed to point out briefly some of the required amendments which the almost unanimous voice of public opinion seems most loudly to call for.

"The part of the act which most loudly calls for amendment is that which provides for raising a part of the Teacher's salary by a rate-bill. I do not recollect of having met with so much as one intelligent Trustee in the District who, if he expressed an opinion at all, did not condemn the present system, and pronounce it unsuited to the wants of the Country. On this subject I think I hazard nothing in asserting, that all who are capable of forming an opinion are unanimous. With respect to what ought to be substituted in place of the present rate-bill, the opinions appear to be somewhat divided. Some would prefer a uniform rate-bill upon all the children residing in the school sections (reserving the power of the Trustees to excuse any for good reasons) whether in attendance or not. Others, (and I believe they include among them our most enlightened and virtuous citizens) hold that the property of the Country ought to be held for the education of all, no less than for the protection of all. My own opinion is, that an amendment of that part of the act, based upon either of these principles, would be a most valuable improvement of the present system.

"Another amendment that seems to be called for, regards the powers which ought to be entrusted to the boards of Trustees. These ought to be considerably extended. They ought to be empowered, by Law, to decide, in all cases, whether it were necessary to levy an assessment upon their own school sections respectively, and to what amount: whether for building or repairing school-houses, for purchasing books and apparatus, or for paying Teachers.

"Lastly, I beg to submit to the Council whether it would not be desirable to provide for the more equitable distribution of the School Fund. At present each section receives an amount in proportion to the number of children residing within its bounds, whether these children attend the school or not, and also without reference to the length of time the school is kept open. So that two school sections in which the number of children is equal the amount they will receive from the School Fund will be equal, though in one, all the children may attend the school the year round, and in the other, only one half or one third may attend for six months only. A juster principle, it seems to me, would be one which should offer aid to parties from the public fund, in proportion to the amount of local effort put forth by themselves, giving encouragement to children who actually attend the school, and withholding it from all who do not."

Substantially the same views have been expressed to us in communications from other Districts, and in personal intercourse with local School authorities. In some Districts the Councils have formally recommended that no certificates of qualification be given by School Visitors.

During a tour of the several Districts of Upper Canada, in the autumn of 1847, the Chief Superintendent of Schools largely conferred with persons best informed and deeply interested in the advancement of Common Schools; and he found their views almost unanimously in harmony with what is suggested in the above extracts, with a most anxious desire that some provision should be made for the establishment of *Common School Libraries*. He has, several months since, submitted to the consideration of Government the results of his inquiries and experience, with a view of remedying the defects referred to in the details of the Common School Law. It was hoped, in the first instance, that during the session of the Legislature, held early in 1848, these widely felt defects in those details of the School law which directly concern the District Councils and Trustees, would be remedied. No business of importance was done during that session; and the Legislature not having met last autumn, as had been expected, the subject of improving the details of the School law by passing a few additional clauses has been necessarily deferred until the present time. The local wants and wishes of the people can be easily met in these matters of practical detail without reference to the merits or demerits of the general provisions or organic features of the School law, which may be modified at any time when it may be thought expedient. Whatever may be the leading administrative provisions of the School law, experience has clearly shown, and has produced a strong and general conviction, that Common Schools cannot be rendered efficient without more municipal power being given to the people in their several School Sections. We think that each School Section, through its own elected Trustees, should have full power to support its own School in its own way, and that every provision which trammels this discretion has proved injurious to the interests of Common School Education in this country, as it has confessedly heretofore proved in some of the neighbouring States.

We hope the disadvantages and discouragements under which the Trustees of School Sections have so deeply felt themselves labouring, will soon cease to exist, and that such additional provisions will be made as will greatly lessen the trouble of working out the details of the School law, and proportionably improve its efficiency.

Common School Income Bill.—The whole country will rejoice to read the provisions of the following Bill, which was recently brought into the House of Assembly, as a Government measure, by the Hon. Mr. Price, and which has already passed the second reading. For an account of what passed in the Legislative Assembly when this important measure was introduced, see page 46, under the head of *Educational Intelligence.*

An Act *to raise an Income of One Hundred Thousand Pounds out of the Public Lands of Canada, for Common School Education.*

Whereas it is desirable that an annual sum of one hundred thousand pounds should be raised from the Public Lands of this Province, for the maintenance and support of Common Schools therein, and that so much of the first monies to be raised by the sale of such Lands as shall be sufficient to create a Capital which shall produce the said annual sum of one hundred thousand pounds at the rate of six per cent., per annum, should be set apart for that purpose: Be it therefore enacted, &c., That all monies that shall arise from the Sale of any of the Public Lands of the Province, shall be set apart for the purpose of creating a Capital which shall be sufficient to produce a clear sum of one hundred thousand pounds per annum, which said Capital, and the income to be derived therefrom, shall form a Public Fund to be called the Common School Fund.

II. And be it further enacted, That the Capital of the said fund shall, from time to time, be invested in the Debentures of any public Company or Companies in the Province, which may have been incorporated by an Act of the Legislature, for the construction of works of a public nature, and which said Company or Companies shall have subscribed their whole Capital Stock, paid up one-half of such Stock, and completed one-half of such work or works or in the Public Debentures of this Province, for the purpose of creating such annual income which said fund and the income thereof shall not be alienated for any other purpose whatever, but shall be and remain a perpetual fund for the support of Common Schools, and the establishment of Township and Parish Libraries.

III. And be it further enacted, &c., That the Commissioner of Crown Lands, under the direction of the Governor in Council, shall set apart and appropriate one million of acres of such public lands, in such part or parts of the Province as he may deem expedient, and dispose thereof on such terms and conditions as may by the Governor in Council be approved, and the money arising from the sale thereof shall be invested and applied towards creating the said Common School Fund: Provided always, that before any appropriation of the monies arising from the sale of such Lands shall be made, all charges thereon for the management or sale thereof, shall be first paid and satisfied.

IV. And be it further enacted, &c., That so soon as a net annual income of fifty thousand pounds shall be realized from the said School Fund, the public grant of money paid out of the Provincial Revenue for Common Schools, shall forever cease to be made a charge on such revenue: Provided always nevertheless, that in the mean time the interest arising from the said School Fund so to be created as aforesaid, shall be annually paid over to the Receiver-General, and applied towards the payment of the yearly grant of fifty thousand pounds now appropriated for the support of the Common Schools: Provided further, that after the said annual sum of fifty thousand pounds shall have been taken off the Consolidated Revenue, and the income arising from the said School Fund, shall from any cause whatever fall short of the annual sum of fifty thousand pounds, then it shall and may be lawful for the Receiver-General of the Province to pay out of the said Consolidated Revenue such sum or sums of money as may from time to time be required to make up such deficiency, the same to be repaid so soon as the said income of the said School Fund shall exceed the said sum of fifty thousand pounds.

Public Sentiment in the United States on Common School Education—The following remarks on this subject, by the Cincinnatti *Western School Journal* for last month, touch the mainspring of social advancement among our American neighbours, and suggest a practical lesson to public and all good men in Canada :—

"How encouraging it is to those engaged in Educational labour, to observe the increasing degree of interest with which the object of their efforts is viewed by the public authorities of the land. For many years, from the time when Washington said 'Promote, as an object of primary importance, institutions for the general diffusion of knowledge,' a few clauses on education have formed favourite—almost stereotyped parts of public documents, such as our Governors' Messages, whose views and recommendations have too often been passed by, without very strenuous efforts being made to reduce them to practical application. Now, however, better attention is given to the subject. Our Governors' Messages, now, not only speak of what it is expedient to do, but of what has already been done, showing that their remarks on the subject are no longer mere empty words. The public functionary is, or ought to be, the exponent of the sentiments of his constituents, on this, as on other subjects; and public sentiment is re-acted upon, moulded and directed by him, in proportion to the extent and soundness of his views and his ability in unfolding them. These notions came to us from observing the ground assumed by the public officers and the leading papers, not only of the well educating States, but of many which have not at all distinguished themselves by zeal in the cause of Public Education.

Of the Official Reports of Schools in New-York and New-Hampshire, we will, in another place, speak more at large. In those States and their immediate neighbors which have well matured systems of Education, we need here say naught. It is in those which are yet in their teens, as regards this kind of enterprise, that the slighest movement must attract attention.

Our readers are already aware of the manner in which the people of Indiana and Kentucky view the subject of Education. The people of the former State, by a large majority, have decided that they themselves should be taxed for the support of *Free* Schools, and their Legislature has passed laws in accordance with the popular vote; while in the latter, by a majority of thirty-seven thousand, the people have determined to provide in a similar manner for the permanency of a Common School system; and in his late message, Governor Crittenden calls the attention of the Legislature to the subject of Education, in connection with the above vote of its constituents. In like manner, in the State of of Missouri. the Governor in his message directs the attention of the Legislature to this subject, and recommends the thorough organization and establishment of a system of Common Schools.

In Georgia, too, and in North Carolina, there appears to be an awakening on this subject. In leading papers published at the capitals of these States we often read able articles, directing the attention of the men of the South to the fact of their being so far behind their Northern brethren in many of the elements of prosperity, referring to the principal and obvious cause—the absence of those excellent means of Public Instruction which it is the privilege of the masses in many of the Northern States to enjoy; through which, their industry, skill, and capital are controlled, directed, and multiplied under the influence of intelligent, disciplined minds—and calling upon the people to meet this blight upon their prosperity boldly, face to face, and to remove it from their midst.

Some months ago, Governor Johnson, of Louisiana, in a special message, called the attention of the State Legislature to the necessity for making proper provision for a system of Free Public Education for that State. Deliberation upon this important question, to judge from the reported proceedings, constituted the greater part of the business at the late Legislative Session. The result of these deliberations is, that five hundred thousand dollars have been appropriated to the support of Public Schools throughout the State, except in the city of New-Orleans. And for the support of the public schools of that city, an additional appropriation of fifty thousand dollars has been made.

The Governor of New-Jersey, too, is urgent upon this matter. His message shows that a large portion of the children of that State are being but ill prepared for their future duties as citizens, since out of 102,412, between five and sixteen years of age, only 52,795 attended school during any part of the year preceding the date of the last School Report. He also suggests the propriety of establishing a State Normal School.

But we might go on and fill up our whole space with instances of this kind.

Miscellaneous.

The Teacher's Ability and Duty to aid the Parent.—The subject we are lamely discussing is as long as it is broad. We have considered parents' duties and teachers' duties; and a captious observer will find his hands full, if he sets about noticing the delinquences that may be seen in both classes.

The parent's field is at home. Almost all the physical and moral habits of the child *begin* at home. The mind—the intellect may bear the impress of the teacher; but the body, the soul—the affections and moral nature—are marked by domestic influences.

The history of the internal state of a family may often be read in the children's clothing. A parent's faithfulness may be tested by a child's language and gestures. A father's beastiality is often revealed, only by the ridiculously faithful miniature, presented in the son. A mother's want of refinement shows itself, often, in hoydenish, boyish daughters. Epicurism at the family table is revealed by a family of fat gluttons. Sordid narrowness may be concealed by any man, so far as himself is concerned; but it will be read in his children by any one who will study them.

Now if the parent, conscious of all this influence over the physical and moral nature, undertakes systematically to use it well, he

has a right to claim aid from the teacher. The six hours that a child spends at school should not dissipate the work of the ten hours of home education. If the parent labors to correct a bad posture of the body at home, it should be told to the teacher, that he too may correct it at school.

If a child is unamiable at home, and a parent by kindness is trying to develop heart—then, at school, the teacher ought to know it and labor to attain the same end.

In short, the simple idea we are now thinking of is, that an active educating parent should make the teacher a participant of his plans, that he may be able to aid in their accomplishment; and that the teacher should aid to complete, or, at least, carry on any enterprise that has been intelligently begun at home.—*Hartford Courant.*

Effects of Education and Free Schools.—Out of universal education come genius, skill, and enterprise, and the desire of bettering one's condition. Industry and frugality are their concomitants. Diversified labor secures a home market. Diligence earns much, but the absence of the vices of indolence saves more. Hence comforts abound, while capital accumulates. After the home consumption is supplied there is a surplus for export. The balance of trade is favorable. All the higher institutions of learning and religion can be liberally supported. These institutions impart an elevated and moral tone to society. Hence efforts for all kinds of social ameliorations. Temperance societies spring up. Societies for preventing crimes; for saving from pauperism; for the reform of prisons and the reformation of prisoners; for sending missionaries to the heathen; for diffusing the Gospel—all these, where a sound education is given, grow up in the order of Providence, as an oak grow out of an an acorn.

The Free-schools of the North lead to the common diffusion of knowledge, and the equalization of society. The private schools of the South divide men into patricians and plebeians, so that, in the latter, a nuisance grows out of education itself. In the public schools of New York there are libraries now amounting to more than a million of volumes. In the schools of Massachusetts, the number of volumes is relatively less, but the quality is greatly superior. In each of these States, within half an hour's walk of the poorest farm-house or mechanic's shop, there is a library, free and open to every child, containing works of history, biography, travels, ethics, natural science, &c., which will supply him with the noblest capital of intelligence, wherewith to commence the business of making himself a useful and intelligent citizen. With the exception of New Orleans, (whose Free-schools were commenced and have been presided over by a Massachusetts man,) and three or four other cities, all the libraries in the public schools of the slave states could be carried in a schoolboy's satchel.—*Hon. Horace Mann.*

Conversational Powers.—Men of genius, and wisdom have often been found deficient in conversational powers. Adam Smith ever retained in company the embarrassed manners of a student. Neither Buffon nor Rousseau carried their eloquence into society. The silence of the poet Chaucer was held more desirable than his speech. The conversation of Goldsmith did not evince the grace and tenderness that characterize his compositions. Thompson was diffident and often uninteresting. Dante was taciturn, and all the brilliancy of Tasso was in his pen. Descartes seemed formed for solitude. Cowley was a quaint observer; his conversation was slow and dull, and his humor reserved. Hogarth and Smith were absent-minded, and the studious Thomas Parker said that he was fit for no communion save with the dead. The celebrated Hamilton, Franklin, and a host of others, of America, were deficient in that fluency which often fascinates a promiscuous circle.

"Our Young Men."—How much is comprehended in the short and simple phrase "Our Young Men!" The hope of families, of churches, of nations—of the present and future generations, all centres there. When Cataline attempted to overthrow the liberties of Rome, he began by corrupting the young men, and framing them for daring and crime; and in that he acted with true and keen discernment, for while they remained uncorrupted the foundations of social order were secure, and no attempt made against the commonwealth could prosper.—*Rev. John Angell James.*

Quadrature of the Circle.—Mr. Seba Smith delivered a lecture in Portland, lately, on "The Quadrature of the Circle," in the course of which he claimed that this problem, the solution of which has from time immemorial set at defiance the ablest mathematicians, and been demonstrated to be impossible, has at length been accurately solved by John A. Parker, formely of Portland, and now of New-York. Mr. Smith farther stated that several important astronomical calculations have already resulted in consequence. The processes which led to this solution are in preparation for the press, and will soon be published.—*New York Observer.*

Musical Instruments—their origin.—Every tightened string which vibrates in the air, every hollow tube through which the wind passes, taught man the use of instruments. A thick or long string or tube produces deep sounds; a thin or short, high ones. In this simple discovery lies the principle of all stringed and wind instruments. If the string be stretched upon a piece of wood, the finger which presses upon the board diminishes its length, and consequently raises the sound. The same result is obtained by making holes in the iron tube or the wooden pipe. By covering or uncovering these holes with the fingers, we render the column of air contained in the tube longer or shorter, which, set in motion by the wind, or by the mouth, gives higher or lower notes. The notes which chance seems at first to produce, are by a little skill and observation brought into connection, and thus the regular scale of ascending and descending notes is established.—*Mainzer.*

The Coal Fields in England and Wales.—A Ruabon correspondent of the *Chester Chronicle*, signing himself "Asbestos," says that the North Wales coal fields, measuring from the point of Ayr, in Flintshire, to a few miles beyond Oswestry, in Shropshire, cover an area of 200 square miles, of ten yards in thickness. The weight of a cubic yard of compact coal is 19 cwt. 16 lb. The total weight of the coal in this extensive area will thus be 5,929,690,000 tons. These coals, at 6s. per ton at the mouth of the pit, would produce £1,778,907,000. To exhaust this field it would require that 2,000,000 tons be worked annually for nearly 300 years. The extent of the other coal fields in England and South Wales, estimated at the same thickness as the North Wales fields, would yield 177,890,700,000 tons, which would furnish us with 40,000,000 tons of coals for nearly 4,000 years.—*English Review.*

Astronomical Clock.—After four years' labour, the repairs of the astronomical clock at Strasburg are completed, and it will be set in motion on the meeting of the Scientific Congress on the 28th. In this curious piece of mechanism the revolutions of the sun, the moon, and the planets are marked down with scientific exactness. Seven figures represent the seven days of the week, each appearing in its turn on the day allotted to it. The four ages come forward to strike the quarters, and the skeleton Death strikes the hours. At noon the twelve Apostles advance in succession to bend down before the figure of our Saviour, who gives them the benediction. At the same moment a cock claps his wings and crows three times. It is said to be one of the most curious pieces of clock-work in Europe.—*Athenæum.*

Eclipses in 1849.—In the year 1849 there will be four eclipses—two of the sun and two of the moon. One of the lunar eclipses will be visible in the United States. The first eclipse will be of the sun, on the 22nd of February, and will be visible in the western portion of Asia and the northwestern portion of North America. The second of the moon, on the 8th of March, and will be visible throughout the United States. [This eclipse was visible at Toronto. —Ed.] The third will be a total eclipse of the sun on the 17th of August; and the fourth an eclipse of the moon on the 2nd September—both invisible in the United States.—*American Almanac.*

The Three Great Physicians.—The bedside of the celebrated Dumoulin, a few hours before he breathed his last, was surrounded by the most eminent physicians in Paris, who affected to believe that his death would be an irreparable loss to the profession. "Gentlemen," said Dumoulin, "you are in error. I shall leave behind me three distinguished physicians." Being pressed to name them in the trio, he answered—"Water, Exercise, and Diet."

Science and Practical Arts.

THE STEAM ENGINE.

WITH ILLUSTRATIONS.

Intending from time to time to furnish instruction and entertainment to our junior readers in several branches of the Elements of Natural Philosophy and Mechanical Science, we will commence with some account of a machine which is, more than any other, identified with the commerce and manufacturing industry of Europe and America—a machine exhibiting a series of contrivances which, "in exquisite and refined ingenuity, stand without a parallel in the annals of mechanical science," and producing a saving of labour and a productiveness of mechanical power without a parallel in the annals of Commerce and Manufactures. Our limits confine us to a few explanations and facts.

The STEAM ENGINE is a mechanical contrivance by which fuel of any kind may be made, by means of water, to execute any kind of labour. The motive power of this mechanical contrivance, or the power by which the steam engine is put in motion, is that of STEAM, or *vapour of water*.

Let us consider, first, how this power is *produced*, and secondly, how it is *applied* in the working of the steam engine.

Heat expands most substances by separating the particles of which they are composed. Thus it separates the particles of metals, wax, &c. Its effects upon water are most remarkable. The particles are totally separated; they are converted into an invisible gas or vapour, called *steam*; and their extension is wonderfully increased.

The temperature at which water is converted into steam under the ordinary pressure of the atmosphere is 212°. The steam thus formed has a bulk about *seventeen hundred* times that of the water which is evaporated to produce it; or a cubic inch of water expands to about a cubic foot of steam.

The *mechanical force* which is developed by this conversion of water into steam is very great, and is in proportion to the degree of temperature at which steam is formed. Steam formed at a temperature of 212°, has a mechanical force equal to the pressure of the atmosphere—that is about 15lbs. on every square inch of surface exposed to it; formed at a temperature of 251°, the elastic or mechanical force of steam is equal to the pressure of two atmospheres; formed at a temperature of 292°, it has a tension of about four atmospheres, or a mechanical force of 60 lbs. to the square inch of surface exposed to it. The only limit to the power of steam is the strength of the vessel or boiler in which it is generated. The pressure of steam, as usually employed, is about that of two or three atmospheres. When the tension of steam exceeds three atmospheres, it is called *high steam.*

As steam engines when first brought into use were chiefly applied to work pumps for draining, and for mills which had been previously worked by horses, their power was estimated by a comparison with that of the horses which they superseded. Steam engine builders were, therefore, accustomed to contract to supply engines capable of executing the same work as had been previously executed by a certain number of horses. It was found, on experiment, that a strong horse, working for eight hours per day, could perform a quantity of work equal in its mechanical effect to raising 33,000 lbs. one foot per minute, or 1000 lbs. thirty-three feet per minute. This is the unit of engine-power which is generally adopted.

As to the mechanical force which the evaporation of a given quantity of water is capable of producing, the following are a few of the many curious facts which writers on the steam-engine have stated;—

A *pint of water* may be evaporated by *two ounces of coals.* In its evaporation, it swells into two hundred and sixteen gallons of steam, with a mechanical force sufficient to raise a weight of *thirty-seven tons* a foot high. The steam thus produced has a pressure equal to that of common atmospheric air; and by allowing it to *expand,* and *by virtue of its elasticity, a further mechanical force* may be obtained, at least *equal in amount to the former.* A pint of water, therefore, and two ounces of coal, are thus rendered capable of doing as much work as is equivalent to raising seventy-four tons a foot high.

The circumstances under which the steam engine is worked on a *railway* are not favourable to the economy of fuel. Nevertheless, a pound of coke (charred pit-coal,) burned in a locomotive engine will evaporate about five pints of water. In their evaporation they will exert a mechanical force sufficient to draw two tons weight on the railway a distance of one mile in two minutes. Four horses working in a stage-coach on a common road are necessary to draw the same weight the same distance in six minutes.

A train of coaches weighing about eighty tons, and transporting two hundred and forty passengers with their luggage, has been taken from Liverpool to Birmingham, and back from Birmingham to Liverpool, the trip each way taking about four hours and a quarter, stoppages included. The distance between these places is ninety-five miles. This double journey of one hundred and ninety miles is effected by the mechanical force produced in the combustion of four tons of coke, the value of which is five pounds. To carry the same number of passengers daily between the same places by stage-coaches on a common road, would require twenty coaches, and an establishment of three thousand eight hundred horses, with which the journey in each direction would be performed in about twelve hours, stoppages included.

The circumference of the earth measures twenty-five thousand miles; and if it were begirt with an iron railway, such a train as above described, carrying 240 passengers, would be drawn around it by the combustion of thirty tons of coke, and the circuit would be accomplished in five weeks.

The great pyramid of Egypt stands upon a base measuring seven hundred feet each way, and is five hundred feet high, its weight being twelve thousand seven hundred and sixty millions of pounds. Herodotus states, that in constructing it one hundred thousand men were constantly employed for twenty years. The materials of this pyramid would be raised from the ground to their present position by the combustion of about four hundred and eighty tons of coal.*

The great and peculiar property of steam on which these its amazing mechanical agencies depend, *is its power of exerting a high degree of elastic force, and losing it instantaneously.*

2. Let us now turn to the mechanism, by means of which the expansive force of steam is applied to useful purposes. The *facts* that mechanical force is produced in the *conversion of water into steam*—that a further mechanical power arises from the *expansion of steam*—that steam may be instantaneously reconverted into water, contracting its dimensions from a cubic foot to a cubic inch, and thereby producing a vacuum—are *discoveries;* but the mechanism on which the useful application of those natural forces depends, is an *invention.* The discovery of the several facts relative to the mechanical powers and properties of steam is due to several discoverers; and the different parts of the various and complicated mechanism by which these forces are rendered universally available as a

* *Lardner's Steam Engine, Steam Navigation, and Railways.*

moving power, may be traced to several inventors. But we have no room here to narrate the inventions and improvements by which the steam engine has been brought to its present state of comparative perfection.

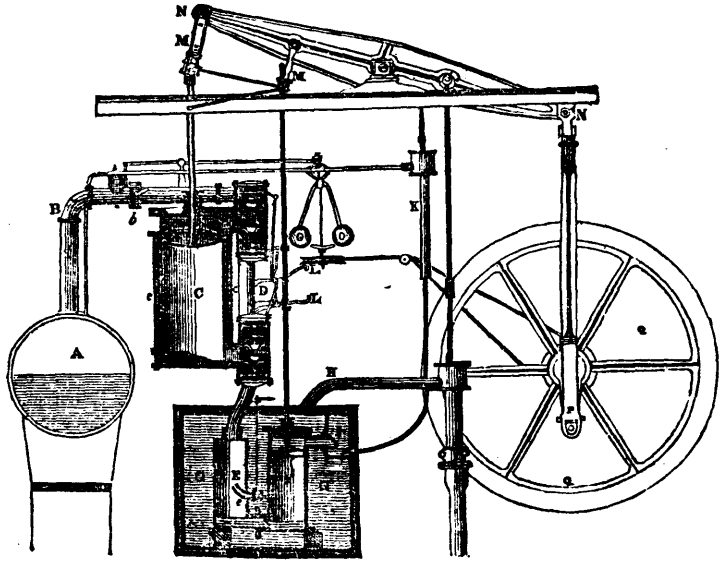
The steam is generated in a vessel called the *boiler*—which is usually made of wrought iron. The *forms* of the boiler are various—the cylindrical form being the strongest. The quantity of steam generated depends upon the area of the surface of the boiler which is exposed to the fire or flame. Eight square feet are sufficient to generate the steam required for the nominal unit called a horse power, when low steam is generated, and nine square feet are allowed in the use of high steam.

The steam is conveyed from the boiler to another vessel, termed the cylinder, by a pipe which is called the *steam* pipe, and from which there are two branches, the one opening into the cylinder at the top and the other at the bottom. In the steam pipe and in each of its branches, there is a valve to admit or exclude the steam. There is another pipe called the *eduction* pipe, having two branches also, with a valve in each to convey the steam from the upper and lower part of the cylinders to the *condenser*, in which the steam is reconverted into water, which is conveyed thence through a pipe, (by means of a pump,) back to the boiler.

Before the time of JAMES WATT, (1763,) the steam was conveyed from the boiler to the lower part only of the cylinder—causing the piston to move upwards, when the steam was condensed by the injection of cold water, thereby producing a vacuum in the cylinder, and the piston was pressed downwards by the weight of the atmosphere. This was called the "*Single* acting Engine;" and as its chief moving power was derived from the pressure of the atmosphere, it was termed by the Marquis of WORCESTER, SAVARY, NEWCOMEN and COWLEY, the "*Atmospheric* Engine." WATT invented the method of employing steam as an acting power in pressing the piston downwards as well as upwards; and the engine as thus improved is called "Watt's *Double* acting Engine." An immense loss of fuel and of power was occasioned by condensing steam in the cylinder; Watt's second great improvement in the steam engine (but first in order of time) was the invention of a method of conveying or educting the steam from the cylinder, and condensing it in a separate vessel, the condenser; thus producing the "Double Acting *Condensing* Engine." Formerly, the lever or working beam was connected with the piston rod by a chain, and had at this extremity (as well as at the other) a circular segment in order to adapt its reciprocating circular motion to the rectilineal motion of the piston rod. WATT superseded this clumsy and defective arrangement by his *appendages for parallel motion.* He also devised the application of the *governor.* To the inventive genius of this great man the world is therefore indebted for the *double action*, the *condenser*, *the appendages for parallel motion*, and the application of the *governor* of the steam engine.*

Having no room in this number for further and intended explanations of the different parts of the steam engine, and the principles on which its power is calculated, we subjoin a figure of the engine to which we have just alluded.

WATT'S DOUBLE-ACTING CONDENSING STEAM ENGINE.



Explanation of the figure.—This figure represents WATT'S double-acting condensing steam engine. A represents the boiler, containing a large quantity of of water, which is replaced as fast as portions are converted into steam. B is the steam-pipe, conveying the steam from the boiler to the cylinder C, having a steam-cock *b* to admit or exclude steam at pleasure. C is the cylinder, surrounded by a case or jacket, leaving, between the cylinder and case, a space kept constantly supplied with hot steam, in order to keep the cylinder from being cooled by external air. D is the eduction-pipe, conveying the steam from the cylinder to the condenser. The *valve* of the *steam-pipe* at the top of the cylinder, and *that* of the *eduction pipe* at the bottom (mentioned in a former part of our remarks), are opened at the same time by the same lever L, and *vice versa.* E is the condenser, with the valve *e*, called the injection cock, admitting a jet of cold water, which meets the steam the instant that the steam enters the condenser. F is called the air-pump, because it removes from the condenser not only the hot water, but also the air, and the steam which escapes condensation. G G is a cold-water cistern, which surrounds the condenser, and supplies it with cold water, being filled by the cold-water pump, which is represented by H. I is the hot-well, containing the water forced into it from the condenser by the pump F. K is the hot water pipe and pump, conveying back the water of condensation from the hot well to the boiler. L L are levers which open and shut the valves in channels between the *steam-pipe* and *cylinder*, and the *eduction-pipe* and *condenser*, and are raised or depressed by projections, attached to the piston-rod of the air-pump. M M is an apparatus for changing the circular motion of the working-beam into parallel motion, so that the piston-rods are made to move in a straight line. N N is the working-beam, which being moved by the raising and falling of the piston in the cylinder C, attached to the end of the beam by a rod a little below M, communicates motion to the fly-wheel by means of the rod and crank N P; and from the fly-wheel the motion is communicated by bands, wheels, or levers, to the other parts of the machinery. O O is the governor which, being connected with the fly-wheel, participates in the common motion of the engine, and the balls will remain at a constant distance from the perpendicular shaft, as long as the motion of the engine is uniform; but whenever the engine moves faster than usual, the balls will recede further from the shaft, and, by raising a valve connected with the boiler, will let off such a portion of the force as to reduce the speed to the rate required.

The modifications of the engine for the purposes of railroads and water navigation, together with further illustrations by engravings, must be deferred (for want of room) to a future number.

(To be continued.)

NOTE.—The figure and some of the explations in this article are taken from "*Parker's Philosophy*," published by A. S. BARNES & Co., N.Y.,—an excellent School book.

* The difference between *high* and *low pressure* steam engines is as follows: The *high pressure* engines have no *condensers.* They are therefore sometimes called non-condensing steam engines. The steam, after having moved the piston, is let off into the open air, producing a disagreeable noise. As this kind of engine occupies less space, is much less complicated and expensive, it is generally used on railroads, on small ferry and canal boats, and in small manufactories. In *low pressure* or condensing engines, the steam, after having moved the piston, is condensed, or converted into water, and then conducted back into the boiler.

Educational Intelligence.

CANADA.

Common Schools in the Talbot District—Extract from the Report of the Rev. William Clarke to the Council.

Education Office, T. D., Simcoe, Feb. 6, 1849.

Mr. Warden and Gentlemen,—Since I have had the honor of receiving at your hands the office of Superintendent of Common Schools in this District, a period of five years has elapsed, during which I have felt it my duty to present you with an annual Report, embracing topics of interest connected with the educational department committed to my trust. During the past year there have been ninety Schools in operation, which, with some few exceptions, I have personally visited and examined; and, I am pleased to report, that there has been an advance on the previous year, both in the time during which they have been kept open, and also in the amount and diversity of instruction communicated; several branches of study having been introduced into many Schools, which were untaught before. Still, in some sections the cause has rather retrograded than otherwise, which may be attributed to the following reasons:—

1. Local differences and prejudices.
2. The deficiency and variety of School-books.
3. The parsimony of the people; and
4. The scarcity of well qualified and accredited Teachers.

Gentlemen, the latter will at once be apparent when I inform you that in your District there are not more than *sixteen* Teachers of the first class, and *twenty-four* of the second; while there are between fifty and sixty of the third or the least qualified class.

In such a state of things you will at once perceive that there must, of necessity, be some sections suffering all the consequences arising from insufficient Teaching. It is, however, important to observe that there is an addition of six first class Teachers, as compared with the previous year, and in those sections where there is cordial co-operation and a remunerating salary, Teachers of the first class are readily obtained; but where there is known antagonism and poor pay, such Teachers are of course unwilling to engage.

This may show that unreasonable expectations or hasty animadversions should not be indulged. Some of the third class Teachers receive certificates from School Visitors, any two of whom are authorized to give them. In some cases the employment of an insufficient Teacher is to be attributed to the Trustees themselves, who are anxious to keep the School open the prescribed time at the lowest price, while not unfrequently your Superintendent has to decide whether there shall be a modicum of instruction or none at all; whether there shall be half a loaf or no bread. Only let correct principles be diffused,—let the importance of education be pressed home upon the public mind, and then we may patiently but confidently hope that as first class Teachers are multiplied and settled among us, through the medium of that valuable institution, the *Provincial Normal School*, the character of our Schools will be gradually improved, and the best modes of imparting instruction will generally, if not universally, prevail.

Grafton Common School Examination, Feb. 9th.—There are upwards of fifty scholars attending this School, and it was most gratifying to find the great improvement they all exhibited in the various branches of learning taught them by their able and most indefatigable Teacher, Mr. Wm. Watson, lately from the Normal School, Toronto, who has been only three months in charge. The new and much improved system of teaching introduced by him, has already produced the most admirable and beneficial results. The following is the Report of the Visitors:—

"Grafton, 9th February, 1849.

"We, whose names are subscribed, have this day examined the School taught by Mr. Wm. Watson, in School Section, No. 2. We were highly satisfied with the appearance of the School, and with the spirit and accuracy with which the Scholars went through the various exercises. Mr. Watson evidently devotes much attention to the instruction of the scholars committed to his care, and particularly to their intellectual improvement. They were examined in Geography, the elements of Mechanics, Natural History, Mathematics, and Grammar, besides the more common branches; and in all the exercises acquitted themselves with great credit. On the whole we consider Mr. Watson eminently qualified to act as an instructor of youth.

"Wm. Reid, *Min. Presby'n. Ch.*
"Ames Moore, *D. C.*
"John Steele, *J. P.*
} *Visitors.*"

—[Cobourg Star.

Governor-General's Visit to the College of St. Hyacinthe.—His Excellency the Governor-General and Members of both Houses of the Legislature, having been invited to take part in the ceremony of opening the St. Lawrence and Atlantic Railroad, His Excellency availed himself of the opportunity of visiting the College at St. Hyacinthe. We learn from a Montreal paper that "immediately after arrival at St. Hyacinthe, the company visited the College, and were introduced to the Reverend Superior, after which they assembled in the large hall below, where an address was delivered to His Excellency by one of the Students, to which His Lordship made an appropriate reply in French, and requested that the rest of the day should be granted to the Students as a holiday."

Central Town School of London.—The *Canadian Free Press*, in a lengthened article on the advantages of the projected scheme of the Town Council, London, C. W., to establish an efficient system of Common Schools in that Town, remarks as follows:—"Another recommendatory feature in the projected Seminary is, that the Salaries of the Teachers being included in the general taxes of the town will occasion scarcely a perceptible difference in them. The Trustees will be relieved of the disagreeable necessity of suing for Teachers' salaries; and the honorable feelings of sensitive children will be saved from the pain and the shame of being turned away from school for want of school fees."

House of Assembly in Committee on the Appropriation of 1,000,000 *Acres of Land for the Support of Common Schools in Canada, Feb.* 27.—Hon. J. H. Price laid on the table a message from His Excellency, recommending an appropriation for the support of Common Schools. Mr. Price stated that the object of the motion he had to submit to the Committee was to set apart a sufficient extent of wild lands to produce £100,000 per annum. The lands thus set apart to a specific fund would not only be preserved for that most useful purpose, but would, according to all experience, sell for a much higher price than if sold by the Crown Lands Department. Thus the Clergy Reserve lands produced much more than other Crown lands, because the parties who purchased obtained credit, and could pay much more than otherwise. The hon. gentleman concluded by moving that it is expedient to raise a yearly sum of £100,000 on wild lands for the support of Common Schools.

Messrs. Robinson, Sherwood (Toronto), Wilson, and Col. Prince, complimented the Ministry upon the introduction of this Bill; and the latter gentleman expressed his wish to see some provision made for the education of the colored population, which was very difficult to obtain at present, owing to the repugnance on the part of the white population to mix with them.

In answer to Mr. Cayley, Mr. Price stated that it was not the intention of the Government to propose any change in the present grant of £50,000 per annum, till the new fund derived from the land produced more than that sum. It was proposed to set apart one million of acres specifically for the purpose, and to invest the whole of the proceeds of the Crown lands for the same purpose.

Hon. H. J. Boulton suggested, as a part of the plan, the setting apart a piece of land in each locality by way of a glebe for the school-house and school-master.

The resolution being carried, the Committee rose, reported progress, and obtained leave to sit again.—[Pilot.

Catalogue of the University of Victoria College, 1849.—By the politeness of the Reverend Principal, we have been put in possession of the Catalogue of this College, by which it appears that the total number of Students for the year just closed was 140, being an increase of 25 over the preceding year. We congratulate the Students of this Institution upon the following Prizes, which, we have no doubt, will have a salutary influence on their minds in their efforts to obtain that knowledge which is more precious than gold, and which alone can qualify them to compete, with credit to themselves and with honor to their country, for the more influential, useful, and responsible stations in the community.

By His Excellency the Governor-General,—"The Elgin Prize,"—*Paley's Evidences of Christianity.*

The President's Prize, 1st and 2nd,—*General History.*

The Trustees' and Visitors' Prizes,—*Classics.*

Professor Paddock's Prize,—*Mathematics.*

Connected with the Catalogue is an able, interesting, and most useful Address, delivered before the Faculty and Students, by the Principal, the Rev. Dr. MacNab, at the opening of the present session. This Address, though designed particularly for the young gentlemen connected with the College, may be perused with profit by any who are endeavoring to improve or cultivate their minds.—[Christian Guardian.

New House for District Grammar School.—The Wellington District Council, at its recent sitting, granted the sum of £150 towards the erection and completion of "a building for a new District Grammar School"—the Town and Township of Guelph having guaranteed the sum of £143 towards the same object.

Common School Improvements in Brantford.—"To the Mayor and Council of the Town of Brantford.—The School Trustees beg to report that the state of the Public School of the Town of Brantford is inadequate to the wants of the Town from the increased and increasing number of pupils. The Trustees beg also to state that the old School-house is unfit for use, and they recommend the purchase of a parcel of land for the purpose of erecting a suitable house in the most healthy, central and convenient part of the Town. And as in duty bound, &c.

"William Mathews,
"A. Higinbotham, } *Trustees.*
"William Young.

"*Brantford*, February 14th, 1849."

The proposition, we understand, to purchase two lots from the Odd Fellows, was entertained by the Council, and a High School is to be erected thereon immediately,—both of which will cost from £500 to £600. —[Brantford Courier.

New District Superintendents.—The following important appointments have recently been made by the Municipal Councils of the respective Districts, named:—

The Rev. John Flood, of Richmond, to be Superintendent of Common Schools for the Dalhousie District, *vice* the Hon. Hamnett Pinhey, resigned.

The Rev. William Fraser, of Lochiel, to be Superintendent of Common Schools for the Eastern District, *vice* William Millar, Esquire, resigned.

The Rev. Charles Fletcher, of Goderich, to be Superintendent of Common Schools for the Huron District, *vice* John Bignall, absconded.

College of Regiopolis.—The Roman Catholic Bishop, Clergy, and laity of Kingston have lately had a meeting to petition the Legislature to provide more effectively for Collegiate Education in connexion with their own Church. Similar meetings for similar objects have been held in different parts of the Province.

Appropriation to Common Schools, Nova-Scotia.—The House of Assembly, Nova-Scotia, have lately passed a Resolution, appropriating £15,000 for the support of Common Schools in that Province.

BRITISH AND FOREIGN.

Schools of Art and Design in Ireland.—The Earl of Clarendon, Lord Lieutenant of Ireland, at a recent meeting for the distribution of Prizes in the Drawing School of the Royal Dublin Society, stated, in the course of his truly eloquent speech, that "Schools of Design are about forthwith to be established not only at Dublin, but at Belfast and Cork. The accommodation afforded in this noble edifice, the successful School of Drawing which already exists here; the Library; the Museum; the Botanic Gardens; the Statue Gallery: the collection of casts, to which an important addition has been this year made by government; but above all, the liberality with which the interests of Art and Science are here promoted give this Society a claim to the preference in the location of the Government School of Design. Of the usefulness of such important Institutions I can have little doubt, and still less that it should be here productive of even greater results than in England. For it is not as an unmeaning compliment that I say that the Irish are in my opinion far more apt to learn —they possess much greater ingenuity and much more natural taste than the English. And yet, when I see the improvement that has taken place in England—the greater beauty of form and purity of design that has been introduced into our various manufactures—when I observe that which may be called the *renaissance*—the regeneration of taste in England; and when I know how much that is attributable to the schools of design, or rather perhaps to the acknowledgment of our deficiencies, they tend to produce, I think it is not too much to expect that Ireland, although deprived of the advantage of a fair start, will not be behindhand in the race of competition, where application and ingenuity, correctness of eye, and facility of hand are indispensible to successfully uniting beauty and utility, and adapting them to objects for which there is a constant demand. I trust then that from these industrious schools of art, in Dublin, in Belfast, and in Cork, competing with each other in honorable rivalry, there may issue artists who will not alone do credit to themselves and their country, but will find opening before them new and profitable fields of employment; because with the increasing taste for decoration, and the absolute necessity for improved designs in all our manufactures there has arisen a demand for skilful designers which as yet is far from being satisfied. I would instance a case which I believe was lately brought before the Statistical Society, it is that of the manufacture of ornamental muslin in Belfast employing between 150,000 and 200,000 persons, the success of which is entirely dependent on the novelty and gracefulness of the patterns, and yet the whole of the designs are brought from Great Britain or the Continent; and I have also been informed that upwards of £80,000 is annually sent from Belfast in payment simply of the ornaments on the wrappers in which the linens are made up; and it would be easy to give innumerable instances which open this field of artistical skill and ingenuity, which I am sure exists in Ireland."

Queenwood Agricultural College, England.—The famous "Harmony Hall" where Robert Owen with his infidel brethren attempted to carry out, on a small scale, their views for the regeneration of Society, and to establish the Millennium, has been lately converted into an important Educational Institution. Owen's establishment having been broken up, Mr. Edmondson of Tulketh Hall, near Preston, has been induced to take a lease of it and carry out on a more extended scale the educational principles for which he is distinguished. The celebrated establishment of M. de Fellenberg at Hofwyl, Switzerland, is the model to a great extent, upon which Queenwood College is conducted. The course embraces the classics and all other subjects usually taught in Grammar Schools.—[London News.

New Medical College, Calcutta.—The foundation stone of a very large Medical College has lately been laid at Calcutta by the Earl of Dalhousie, Governor General, assisted by the civil and military authorities of that famous "City of Palaces," together with the members of the Council of Education, &c. The ceremony is said to have been of the most imposing description. The College, including the site, will cost 2,22,090 Rupees.—[Ibid.

Mass Ignorance in England and Wales.—England and Wales with sixteen millions of people, contain nearly eight millions unable to write their names, and not less than five millions unable to read their mother tongue.—[Ibid.

Improvement in the Elementary Schools of Great Britain and Ireland.—The schools for the gratuitous, or nearly gratuitous, instruction of the lower classes have recently been brought to a large degree of perfection. The model-schools both of the National, and British and Foreign, School Societies, the Lancastrian Schools for Manchester and Liverpool, the great schools in Edinburgh and Glasgow, and the model-school established by the National Board in Ireland, are conducted on plans which leave little to be desired in the way of literary education.—[Art Journal.

Jews at the English Universities.—At the examination just concluded at Trinity College, Cambridge, we rejoice to find Mr. A. A. Lewis, a Jew, occupying a prominent position in the "first class." This is an honor never before enjoyed by Jews in Great Britain.—[Montreal Gazette.

Parisian School Statistics.—There are in Paris 337 establishments of primary instruction, capable of receiving 56,621 pupils, viz:—28,472 boys and 28,149 girls.

UNITED STATES.

State Normal School in Michigan.—The Legislature of Michigan has lately passed a law establishing a Normal School in that State.

Children in Schools in the City of Buffalo.—There are now 9,999 children, between the ages of five and sixteen, attending school in the City of Buffalo.

Harvard University.—The Hon. Jared Sparks, LL. D., has been appointed President of this University, vice the Hon. Edward Everett, LL. D., resigned. Simon Greenleaf, Esq., LL. D., has received the appointment of Emeritus, Professor in the Law School. The Hon. E. Everett was chosen a permanent member of the Board of Overseers, in the place of the Hon. J. Q. Adams, deceased. A complimentary address was voted to Dr. Everett on his retirement from the Presidency of the University.

Common School Education in Massachusetts.—There are now 165,000 children attending school in Massachusetts, 3,656 of whom are less than four years old. The amount collected for educational purposes, aside from the State appropriation, for the year 1848, was $754,943, being $100,000 more than were paid any previous year.

Free Academy, New-York.—D. C. Pell, Esq., of New-York, has presented the sum of $500 to the Board of Education of New-York, the interest of which is to be expended in procuring a prize medal for the most deserving scholar in the Free Academy lately munificently established by the Board of Education. An engraving and description of this beautiful Academy will be given in a subsequent No. of this *Journal*.

Editorial Notices.

Provincial School of Art or Practical Knowledge.—The valuable paper of Mr. Hind on this subject, (to which we refefred in our last number) will be found on a previous page ; and we hope the subject of it will engage the attention of the Legislature before the close of the present Session. After the establishment of such a Provincial Institution, it would soon be easy to establish an elementary branch of it in each County or District Town of Upper Canada.

Teachers from the Normal School.—The Superintendent of Common Schools in the London District writes :—"Those of our Teachers who have attended the Normal School are highly popular, and, in their increased efficiency, furnish very plain evidence of the usefulness of that Institution."—This is in harmony with what is expressed elsewhere in this number by the Superintendents of Common Schools in the Brock and Talbot Districts, and in accordance indeed with what we hear from all parts where Teachers from the Normal School are employed. There may, however, be exceptions ; and to prevent an undue responsibility being attached to the Normal School in regard to any such exceptions, we may remark that a mere certificate of *attendance* which may have been given to any student who has attended the Normal School, was never intended as a certificate of *qualifications*, unless so mentioned in such Certificate, but only an acknowledgment of the good character and conduct of the party concerned while attending the Normal School.

Irish National Schools and School-books.—A Dublin correspondent of the *New-York Observer* says—"The National Education Board's Model and Training Schools for Teachers are unsurpassed in Britain ; from them the Schools, educating half-a-million of pupils, are supplied with Teachers ; and their School-books are used in Scotland, and are about to be introduced into the National Schools of England."

The National School-books of the Dublin Board of Education have *been recommended by Her Majesty's Privy Council Committee on Education*—another good endorsement of the judgment and proceedings of the Board of Education for Upper Canada in regard to these excellent books.

School Instruction in the Niagara District.—In a letter from a friend in the Niagara District, dated the 6th March, it is stated—"The Niagara District will continue to do its duty with regard to Education. We have now almost $\frac{1}{3}$ of our children of school age enjoying instruction in the public and private Schools ; and I think this year we will increase the attendance to nearly $\frac{1}{2}$. We will have another School Celebration in September, which, I trust, will altogether eclipse the former one."

It is for the people concerned to say whether the District of Niagara shall not be equalled or excelled by every other District in Upper Canada.

School Architecture.—We hope that every Trustee, Teacher, Parent, and Friend of Educational Improvement, will read the paper which is concluded in this number on School Architecture,—the usefulness of which, we have thought, would be impaired by dividing it. Plans of School-houses will follow.

The Educational Reports for Upper and Lower Canada have been laid before the House of Assembly, and have been ordered to be printed—the former on motion of J. C. Morrison, Esq., the latter on motion of the Hon. Mr. Lafontaine.

We are happy to find by the following remarks of the *Montreal Witness* of the 12th inst., that the Editor of that paper is at length yielding to the force of evidence on the subject of *Free Schools*—notwithstanding his intimation of a contrary opinion in allusion to the *Journal of Education* for April, 1848. We are persuaded that the system which we have sought for the last three years to introduce into Upper Canada will soon be as generally entertained here as it now is in Massachusetts and other Eastern States.

"Common Schools of Massachusetts.—The Common Schools of Massachusetts are now brought to a wonderful degree of perfection, and are all free, in the fullest sense of the term. They are without charge, and the children of the highest and the lowest in Society meet upon an equality in them. A friend, who recently witnessed an examination of one of those Free Common Schools in Boston, speaks in the highest terms of the very superior description of education conferred in them. Indeed, so excellent is it, that wealthy persons were taking their children from superior and select schools, and sending them to the Free Common Schools, on account of the superiority of the latter. It is worthy of remark, however, that the Head Master of the School in question had a salary of $1500, *and deserved it.* These Free Schools are now generally considered by Americans, we believe, to be a great means of uniting all classes of the community in one common affection for their country and and each other."

Provincial Normal School.—*The next Semi-annual Public Examination of the Provincial Normal School* will take place on *Tuesday, Wednesday,* and *Thursday,* the 10th, 11th, and 12th of April. The Summer Session of the School will commence on *Tuesday,* the 15th of May. All candidates must present themselves during the first week of the Session.

ACKNOWLEDGMENTS—*To the 10th March, inclusive.*

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