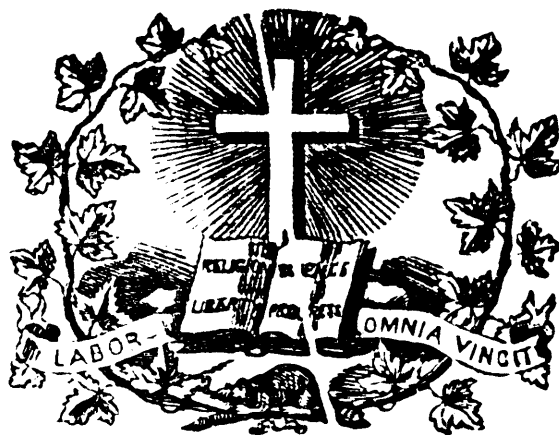


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TABLE OF CONTENTS

<p>The Teaching of Science..... 49</p> <p>Give Your Boys a Trade..... 50</p> <p>Russian School-Mistresses..... 51</p> <p>Teachers' Studies..... 52</p> <p>Education of Girls..... 52</p> <p>The Science of Going up Stairs..... 53</p> <p>Professor Tyndall on Haze and Dust..... 54</p> <p>Indian Costumes and Material..... 55</p> <p>Official Notices: Appointments, — School Commissioners..... 56</p> <p>School Trustee..... 56</p> <p>Separation and Annexation..... 56</p> <p>Diplomas Granted by Boards of Examiners..... 56</p> <p>Editorial Department: Filling up Vacancies in School Boards..... 56</p> <p>McGill University, Medical Faculty..... 57</p>	<p>Annual Meeting of the McGill Normal School Literary Association, Montreal..... 60</p> <p>School of Art and Design, Montreal..... 60</p> <p>Books and Exchanges Received..... 60</p> <p>Miscellany: Education..... 61</p> <p>Literature..... 62</p> <p>Science..... 62</p> <p>Art..... 63</p> <p>Discoveries and Inventions..... 64</p> <p>Meteorology..... 64</p> <p>Advertisements: Wants..... 64</p> <p>The Dramatic Reader..... 64</p> <p>Lovell's Dominion Directory..... 64</p> <p>Official Tables: Apportionment of the Supplementary Grant to Poor School Municipalities for 1869..... 65</p>
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The Teaching of Science.

In a volume of essays lately published, says the *American Educational Monthly*, — in London under the general title, "Woman's Work and Woman's Culture," we find one, contributed by Mr. James Stewart of Oxford from which we extract the following:

In this Essay there are three things that fall to be considered. The first is, What it is that we wish to teach when we say, let us teach Science to women; and the second is, How we are to teach it; and the third is, Why we are to teach it? I shall not consider these three things separately, because each involves the other. At the beginning too, I should like to say, that when I speak of teaching Science, I speak of teaching it not to the few who may extend its boundaries, but to the many, who may learn its lessons. To those few, Nature, I dare say, is the best instructor, and her own philosophy will plead her own cause. But for the mass of people there is a great benefit to be gained from the study of Science. Science teaches us to look outside of ourselves, and to look at things; and it teaches us that the foundation of all true argument is experiment, whereby I mean a previous knowledge of the things about which we argue. And besides teaching us to look outside of ourselves, it teaches us to think for ourselves. One of the true objects of all education is to teach people to think for themselves. And there is perhaps nothing more fitted for this end than Science, and especially for that department of it which is called Natural Philosophy. For to think well we

must think clearly. What Education has to do is to engender the habit of forming clear and distinct notions of things, and above all, of clearly seeing the distinction between these things themselves and our notions of them. The process of acquiring clear and distinct notions is of as much importance as having them. And to reap the benefit of that process we each must go through it for ourselves. In getting into the habit of going through such a process for ourselves we may be helped in three ways. We may be taught by example what the holding of a clear and distinct notion is; we may learn to some extent the successive steps by which some such have been elicited out of confusion; and we may be furnished with some materials from which to elicit some clear and distinct notions for ourselves. All these three ends are well accomplished by the teaching of Natural Philosophy, or, as it is otherwise called, Physical Science; on account of which preeminent union of these three qualities there is nothing which can form a fitter introduction to a course of Education, nor anything therefore with which those, whose education like that of women has been somewhat backward, can better begin. The only objection which might be anticipated to such a subject is that it might be too difficult. But everything which is clear and distinct is easy; it is obscurity only that makes difficulty. Nor need any be afraid of the name Physical Science—Astronomy, Light, Heat, and the like. It is certain that these sciences, in so far as they have been scientifically treated, have been usually involved in the language of Mathematics. But there is no need for that. It is very fortunate that Science has had Mathematics for its handmaid, for therein is the best pioneer and the best registrar of its discoveries; but it is unfortunate for the general scientific education of the world that it has usually refused the service of all other ministers. It is no more necessary to express the great truths of these matters in mathematical language than in the French or in the Greek language; and when the whole is put in our own homely language, perhaps then better than at any other time are we enabled to see how grandly immutable are the facts we have to deal with as compared with the means by which we may happen to express them. For though mathematical language entails an accuracy of expression, it is by no means co-ordinate therewith. Certainly I believe, though there be notable instances to the contrary, that yet scientific eminence is seldom attained by those ignorant of the Mathematics; and

while I therefore believe every teacher of Science ought to have that knowledge, yet that by no means implies such a knowledge in those taught. And the more acute the mathematical ability of the teacher, the less will he require to presuppose that ability in those whom he teaches. There are some of the processes of nature which are most generally represented in the language of differential equations, to translate which requires a very thorough comprehension of them; but yet it can be done, and that in many complicated cases. I mention this, for it behoves us to remember that in teaching Science to women we have to teach it to those who, in the present state of women's education, for the most part are quite ignorant of the usual preliminaries, and especially of the Mathematics; on which account it has been that, generally speaking, there have only been small portions of Science to which women have been admitted, and those rather of a vague and indeterminate kind; whereas one of the chief benefits of Science is in its freedom from vagueness. And on this same account it has been that most of the scientific teaching that has been given to women has consisted rather in the mere enumeration of simple unsuggestive facts, or of the detail of theories, that is, the results of processes, the processes themselves being omitted.

There can be little wonder that such study has never prospered among women, who thereby get a distaste, and exhibit a disqualification, not for Science, but for that which they are taught. But the true education which may be brought to us by the teaching of Physical Science consists not in the detailing of facts, nor in the detailing of results; nay, or even in the detailing of a process, but in so presenting facts that the learner shall at each step be able to advance along the next step of the process for himself. For as we advance along our thought, we come at each succeeding step to many diverging roads; to throw a light across the whole landscape bewilders the young traveller, to carry whom blindfold to the end leaves him unstrengthened for the next attempt. But true teaching is so to hold the lantern that he may at each turn choose the right road for himself. Thus, if I were to conclude in a word, I should say that the true process of scientific teaching is to lead the learner along a road of continual discovery. For that process of ourselves repeating a discovery is that whereby, far beyond all talk of it, we learn what suggestion means; and that whereby we learn, from the repetition of our own success, that which no argument could lead us to.

To teach a process suggestively we must of course adapt ourselves to that which will be suggestive to the person taught; so that teaching of this kind is somewhat of a sympathetic thing, for some need more prompting to a suggestion than others. And it is on this account that nothing can ever supersede the oral teaching of Science and the Mathematics, for in oral teaching alone is there that facility of adaptation.

What is exactly meant by suggestive teaching is, like all good things, best learned by that most practical of answers, the invitation to the practice of it; and within the limits of an Essay like the present it is hard to give an example. If some one were to ask me why the moon has phases; then, if I were to call his attention to the fact, and bid him look for several nights to see, that it was rounded towards the sun, and bid him watch how its bright part increased or diminished, and then were to show him a dusty ball illuminated by a candle,—that would be a piece of suggestive teaching. To some the process would have to be carried a little farther ere their minds would anticipate the explanation. To others, their first observations would be sufficient: these are they to whom so far Nature is herself suggestive, which she is in a large way to those called discoverers, whose frame of mind it is that we aim at, and not the making of discoveries in the natural world. Let us steer clear of that error that the only reason that Science is to be taught to us is that we may extend its boundaries; but that for which we learn it is this, that we may learn its habit of mind in all things, and that habit of mind is one in which we see what things have to do with one another. It is a mistake into which men sometimes

fall, to see in each piece of instruction nothing beyond its own specialty, wherefrom there arises that utilitarian argument that those things which are of immediate use are the rather to be taught.

Give Your Boys a Trade.

The above caption contains excellent advice. The remuneration now secured by skilled mechanical labor is far in excess of that offered in mercantile or professional pursuits. A result of the overcrowding in mercantile and commercial pursuits has been also a reduction in the compensation of those occupying subordinate positions. And in proportion with this reduction, or rather loss of increase to conform with the increased cost of living, has there been a corresponding advance in the pay of skilled mechanics, and likewise in the pay awarded those who are but indifferent workmen. For the scarcity of workmen in most of the trades is such that men but half educated in a knowledge of their craft and ignorant in all else, command good wages. Why, there are plenty of instances that might be cited of men well educated, having a knowledge of the modern languages, thoroughly posted in all branches of mercantile business, who are yet eking out a miserable existence on a salary one-third less than that received by indifferent mechanics who can scarcely write their own names. Parents having sons to rear should ponder this fact. Let them reflect that had these men, with their superior education, adopted a mechanical pursuit, their knowledge and address might have made them master workmen, or peradventure given them a capital wherewith to start in some other business with good prospects of success. Recently a firm advertised for a clerk to fill a subordinate but laborious position at a salary so low none other than a single man of the most frugal habits could possibly subsist upon it, and yet they received over three hundred applications for the place, some of them from parties bringing the highest testimonials as to character, capacity and long mercantile experience. Such men, if skilful masons, could earn \$5 per day; if tailors, or printers, or harness-makers, \$35 a week; if fresco-painters or stucco-workers, higher wages still: if blacksmiths, even, they might show a better exchequer when Saturday night closed their week's toil.

But it is not to be denied that a foolish prejudice, born of mistaken ideas, has existed against most mechanical employments. This, is, however, fast disappearing. It must soon fade from sight altogether; for all callings in life are respectable or otherwise in proportion to the character and calibre of the men who adopt them as a means of livelihood. If mechanics as a class have not heretofore occupied a high social position, the fault is in themselves rather than in their vocation. It is commanded from on high that man should earn his bread by the sweat of his brow, but the curse, if curse it be, makes no discrimination in favor of any particular kind of labor. Whatever may have been the case in days past, we believe that the "dignity of labor" is appreciated by the great mass of the people at the present time, and except by the few "born aristocrats" it is allowed its proper place in the social scale.

We have said nothing of the advantages which a knowledge of a trade confers on those who may, from inclination or circumstances, be called to engage in commercial or other pursuits. They must be apparent to every one who reflects on the fluctuations and uncertainties attendant on trade at all times.

Again, we say, give your boys a trade if they have the slightest mechanical turn—not, of course, neglecting their educational interests, even to a collegiate course if they ask it, and your finances will permit—and then whatever betide them, if they have health they never need want for bread: they are possessed of an unfailing source of supply—a bank which will always honor their drafts.—*Boston Journal*.

Russian School-Mistresses. (1)

An interesting pamphlet has lately been published by an author who adopts the pseudonym of "Schédo-Ferroti," on the subject of "Popular Instruction in Russia." Its chief aim is to show that in spite of all that has been done — on paper — to provide for the education of the Russian people, but very small results have been attained, so far as the enlightenment of the lower classes is concerned. This failure, says the writer, is to a great extent to be accounted for by the difficulty that is universally experienced in finding efficient schoolmasters. In the year 1865 Russia nominally possessed, it seems, as many as 21,420 parochial schools, and since that time many others have been added to the number. But the existence of many of these establishments is merely nominal. In one district, containing 130,000 inhabitants, for instance, at the end of last year there were scarcely four schools in real working order. The funds required for the establishment of 47 new schools had been voted, but out of that number 21 had never even been opened, simply because the requisite teachers were not forthcoming. In another district, two villages, containing respectively 2,723, and 1,476 inhabitants, possessed only one school apiece, and the number of pupils attending the two schools put together was only eight.

This is not very encouraging, but the writer proceeds to state facts which are still less so. Even if it be granted, he says, that much has been done within the last few years to bring education home to the lower classes in Russia, and that advantage has to some extent been taken by the Russian peasant of the means and appliances placed within his reach, still it must be confessed that the people have not benefited to any appreciable extent by the change. If the official reports are to be believed, thousands of Russian men of all ages have lately learnt to read and write; but, in spite of all that says M. Schédo-Ferroti, the Russian common people have become "more brutal, more drunken, less industrious, and less scrupulous with regard to family duties and civic obligations, than they were before they took to being instructed." And for this he accounts by the fact that, although the men may have learnt to read and write, they have not been educated in the proper sense of the word, not having been placed under masters competent to deal with the subjects; and as to the women, they have not even learnt as much as the men. He suggests, therefore, that in the first place better instructors should be found for the existing schools; and, in the second place, that an organized effort should be made to induce the peasants to send their girls to school as well as their boys; for at present that is not the case. The number of boys who are learning to read and write is deplorably small, but it is large compared with that of the girls who are receiving even the slightest amount of instruction.

The position of the Russian woman has long been a very painful one. One of the finest of the poems of Nekrassof, the chief living Russian poet, commences with a description of the sorrows of the great masses of his countrywomen. "Ages have passed," he says, "and everything else in the world has been often changed and improved. But God has forgotten to alter the dreary lot of the peasant woman. And so the old type of the strong and beautiful Slavonian woman has deteriorated. Poor victims of fate! you have suffered unheard. You have never made known to the world the voice of your complaining. You have passed silently through a terrible struggle, and now we see in you the very embodiment of lifelong fear and suffering." Undoubtedly the Russian peasant women too often have a look of the kind which the poet describes, an expression such as one might expect to find on the persons who have been subjected to much hardship, and who have lived in the perpetual expectation of punishment—a worn and anxious look, and an air as though of

premature old age. Much of this is doubtless due to the severity of the climate, with its cutting wintry blasts and its scorching summer suns; but though the weather may tan the skin and account for its unpleasantly wizened appearance, it would be unfair to charge it with all the restless suspicion of the eye, all the melancholy curve of the mouth. Much of that must be considered the result of neglect and unkindness. Even where the husband has not been brutal, he has almost to a certainty been contemptuous. For not only has the peasant been in the habit of treating his wife as a slave, but he has always looked down upon her in all good faith as a very inferior animal. This masculine contempt has been in part accounted for by the custom prevalent among the peasants, in the days of serfdom, of going away from their villages to the towns, in order to procure the *obrok*, or sum of money annually due to their lords. The man went forth into the world, and experience enlarged his mind, or at least expanded his circle of ideas; but the woman remained at home, confined within a very narrow range of thought, knowing nothing of what was going on at a distance from her own little village, never seeing new faces, never hearing an unfamiliar voice. Now that the peasant is a freeman, he has no longer any *obrok* to pay; but the habit of roaming about the country has been confirmed, and he is likely to keep it up. When the husband returns from his travels he naturally comes to the conclusion that his wife is even more foolish than he had always supposed her to be, and he is more than ever convinced of the truth of those opinions which have given rise to a great number of popular proverbs, such as "A woman's hair is long, but her mind is short." "Don't go talking with women; every one knows that women are fools." A hen isn't a bird, nor is a woman a human being." "A dog is wiser than a woman; it doesn't go barking at its master."

It is true that while the Russian woman is young and good-looking she may manage to exercise some influence over her lord, and master, and even to keep him away for a time from the *Kabak*, the pot-house in which he laps himself in what are to him the pleasures of Elysium. But as soon as she loses the fast-fleeting charm of personal attractiveness, all power passes away from her for ever, and she becomes a mere slave, little better than a beast of burden, obliged to obey the behests of one who is too often a brutal master. If she were intellectually, as she is morally, her husband's equal, if not his superior, there might be some chance for her. But, unfortunately, even if the village has provided the means of education, there is little chance of her having been able to avail herself of them. The man may have gone to school; it is almost certain that the woman has not. In olden days, it is true, the peasants were on the same dead level of ignorance, whether they were styled "souls" or not—that is to say, whether they were male or female chattels. But during the reign of Nicholas a number of popular schools were set on foot in the villages, and ten years ago, according to Gerebtsof, the number of pupils frequenting them was in the proportion of 923 to every hundred thousand inhabitants. It is true that in Germany the number of pupils would have been 8,888, but still the figures showed that progress had been made. Since that time the schools have become much more numerous, and the number of boys attending them has grown larger every year. But as far as the peasant women are concerned, very little progress has been made, for the official tables show that the number of girls frequenting the primary schools is about one-eighth of the number of the boys who attend them. From this fact it seems fair enough to draw the conclusion that "the gulf which now divides the man of the people from his wife will become still wider in ensuing generations, if nothing be done to close it.

The reason which the peasants allege for refusing to send their girls to school is twofold. In the first place, they say that they distrust the schoolmasters; in the second, they declare that they cannot see of what use reading and writing will be to their daughters. So far as the teachers are concerned there is some excuse for such a refusal. Most of the schoolmasters are exceed-

(1) *Lettres sur l'Instruction populaire en Russie, adressées à Monsieur le Comte D. Tolstoi, Ministre de l'Instruction publique.* Par D. K. Schédo-Ferroti. Leipsic and Berlin. 1869.

ingly incompetent persons, and it is very difficult to replace them with advantage. Their salaries are so small that no one becomes a schoolmaster who can get any other post. The worst-paid servant of the State, the least valuable clerk in a commercial establishment, receives more than even a favoured village pedagogue, so that the class which is to educate Young Russia has to be recruited from the ranks of "plucked" students and "stickit" ministers, or from those of retired non-commissioned officers or private soldiers, or the sons of persons employed in the lowest classes of the Civil Service. As the supply of even such teachers as already exist is by no means equal to the demand, it is difficult to see how the number of schools the establishment of which M. Schédo-Ferroti thinks necessary can ever be provided with masters, for assuming that there are 8,000,000 of Russian children of a school-going age, he considers that the country stands in need of at least 160,000 primary schools. How to produce an equal number of good and trustworthy schoolmasters is a problem of no small difficulty.

To overcome the objection of the parents to sending their girls to school may prove an easier task. At the present moment they say, "Education may be an excellent thing for boys, but our girls will never have letters to write or accounts to keep; why should we have them taught reading, writing, and arithmetic?" All arguments as to the ulterior benefits of education would be thrown away on utterly uneducated persons. The only thing to be done is to prove that education has its immediate advantages by making it embrace such subjects as the art of needlework and the science of cookery. For this end it will evidently be necessary to have female teachers, and their employment M. Schédo-Ferroti very strongly urges upon the Minister of Public Instruction. If the schools were under the charge of properly trained women, the peasants, he thinks, would no longer refuse to let their girls attend them, and in a few years Russia would see its women placed upon a level with its men, so far at least as primary instruction is concerned.

Nor would there be any difficulty, he says, in obtaining the 160,000 governesses required. They could easily be supplied, if the demand for their services once made itself felt, by the two classes alone of the clergy and the *Chinovniks*. The Orthodox Church employs about 37,000 priests, 13,000 deacons, and 63,000 sacristans, besides other ecclesiastical subalterns. All of these being married people, the Church has a total of about 113,000 families, for the most part very numerous, to offer for educational purpose. To these may be added a large proportion of the families of the 200,000 persons employed in the public service. Altogether the number of households is enormous on which it would be fair to count as likely to supply recruits to the ranks of the teaching class. To them belong, at the present moment, many thousands of Russian women who are condemned to lead a precarious and sometimes a miserable existence. Some of them live by very ill-paid manual labour; others are a grade higher in the social scale, but still can scarcely make enough to live by. It is only the most fortunate of their number who can contrive to find a good position in the superior walks of domestic service, while too many of them are reduced to eat the bitter bread of charity. To all of them such an independent position as that of "Primary Instruction" would be the greatest of boons, and the benefit which would accrue from it to themselves might be rendered back by them to the country at large.

What M. Schédo-Ferroti proposes is that a "Lay Order of Sister Instructresses" shall be founded, into which every one who wishes to become a national schoolmistress shall be received, for the purpose of being properly trained; that the great ladies of every district shall take an interest in the welfare of the local branch of the Order, and shall exercise some supervision over its members; and that its proceedings shall be regulated by the Government authorities. With a little State patronage the Order would, he thinks, flourish vigorously, and in a short time Russia would possess a noble army of schoolmistresses, thoroughly well trained, and tolerably well appointed. Then a combined attack

might be made, under the most favourable auspices, upon those drawbacks to the progress of the country—the ignorance of the common people, and their habits of gross debauchery. Before long the Russian woman would raise herself from the degraded position she has long occupied, and in doing so she would raise with her the Russian man also, and in the course of time the country would be able to boast of a peasantry which emancipation has set free from the degradation of slavery, and which primary education—thanks to the 160,000 school mistresses of the future—will have delivered from the mental shackles of ignorance and bigotry. The picture seems a little overcharged with rosy colour, but everyone must admit that it is fair to look upon. Let us hope that the 160,000 governesses may soon be transferred from the limbo of imagination into the stable world of realized fact.—*The Saturday Review*.

Teachers' Studies.

An academical teacher cannot worthily discharge his educational functions unless he has some leisure for private study, and is enabled to keep himself on a level with the advancing thoughts of the age. If he is merely retailing the little stock which he gathered himself as student, his intellectual poverty will reappear in the minds of his pupils.

Niebuhr used to call his pupils his wings; they would have been leaden wings if he had been required to drudge with them like a teacher of a common school. Nor would Newton have been what he was to England and the world, if as a professor at Cambridge, he had been compelled to give four recitations a day, and to eke out his income by travelling about to deliver public lectures besides. I do not claim for the ministers of learning and science great incomes; they above all men ought to cultivate simplicity of life; but the highest interests of civilisation require that such of them as have shown superiority and devotion to their calling should be released from incessant and engrossing toil for daily bread. If it were only as the indispensable precursors of practical science, which cannot advance without the guidance of previous investigators, such professors would repay reasonable liberality many fold. The prospect of a higher claim is also requisite as a stimulant to the ordinary teacher, whose calling must be otherwise somewhat hopeless, and being hopeless will be apt to be somewhat lifeless.—*Goldwin Smith*.

Education of Girls.

An English Catholic paper concludes an article on this subject as follows:

"There never was a time when the old saying that knowledge is power" spoke a greater or a nobler truth. Then as to the argument that a girl's mind is far inferior to a boy's, upon what evidence is it founded? How often has the falsity of such assertions been proved? Surely this is not the time to keep on with a worn out cry. A boy, as he grows up to manhood, has his mind open to an interest in what is happening all around him, in the books that are written, the discoveries that are made, and in the many steps along our march of progress. But the girl is compelled by her very teaching to keep within herself, to look into her own heart and mind for interest and amusement, and to see in the future nothing but her marriage.—This training shows itself sometimes in what is called a romantic attachment, which is simply nothing more than the fixing upon one object the whole strength of her heart and soul. But it also leads to that love of dress, excitement, and admiration which is summed up in the present day under the term "fast." A husband is the only goal at which most girls are taught to aim, the richer he is the better; so all their energy is forced into one groove, and the consequences are what we see around us. Even a girl will have a restless ambition, a seeking after fame, and being taught that marriage is her only end, all her strength of character is brought to bear upon its attainment. Then comes the love of admiration,

dress, and excitement, the strivings of earnestness misdirected in its aim; and instead of trying to remedy the many evils which arise from this sad state of affairs, we call them "girls of the period," and condemn them for being "fast."

"All this would not be, were girls taught that there is something worth knowing besides accomplishments learned only to attract, and that the best years of a bright life may be spent in a nobler way than striving to get married. We are far indeed from saying that fitness for a wife should not be considered, but would a girl be less fit to make an earnest man's home bright and cheerful, because in her earlier years she had been taught to understand the great truth of science, and could come to him with a large heart and full mind, capable of understanding his hopes and triumphs, the labor of his life, and the work that he was striving hard to do so manfully in the world. Surely, there is nothing in knowledge that should or could make a girl hard, or a woman less a woman.—Does not literature and science only increase the sympathies and open the earth to seek out nobler things? Why, then, are they kept from half the world, and what reason can we give for keeping up that foolish expression of "blue stocking," and always bringing forward those canting notions about "homely women?"

The Science of Going up Stairs.

Every one knows that the ascent of a staircase is more fatiguing than ordinary walking; but current ideas upon the subject, as upon most other familiar things, are loose and inaccurate, and therefore unsuited to regulate practice. Science gives us more precise information about it, which it is important for all to understand.

The planet on which we live, although itself an example of motion on a stupendous scale, seems to be unwilling that any thing else should stir. It puts forth an influence called gravity, which would hold every one of us fast in our places like a vice, if some other agency did not come to set us free. It is a star more than ninety millions of miles away that, liberating us from the chain of gravity, makes it possible to change places. To move a body upon the earth's surface, a counter-force must be exerted sufficient to overcome the pull of gravity, and this counter force is solar energy. In railway locomotion, as is well known, the sun's force, stored up in fuel, is set free by combustion, and converted into a rolling movement through the agency of cranks and wheels. The animal system works on the same general principle, but by different mechanical arrangements. In walking, the solar force stored up in food is liberated in the system and translated into mechanical movement through the agency of contractile muscles and bony levers.

In walking, progression is effected by a succession of lifts, inclinations, and swings. In starting, the body is lifted (for example) by the levers of the right foot, and is inclined forward. The left foot being then raised from the ground, the leg swings forward and is carried by its momentum beyond the right foot. The levers of the left foot now lift the body again, and the right leg swings forward, and so we oscillate along on a pair of pendulums. As walking thus takes place by the pendulous movement, its economy is involved in the law of oscillation. We walk with the least expenditure of power when the intervals of the steps are so timed that each leg swings by its own weight through its natural arc, and there is no extra effort either to quicken or retard the swinging movement. Short pendulums vibrate more quickly than long ones, and therefore short-legged people step quicker than long-legged people, though with no more sense of exertion.

In going up stairs, the mechanism of progression is, of course, the same; but the lifting action, which is the real force-consuming part of the process, is now greatly increased. Instead of being just sufficient to admit of the free swing of the pendulous foot, it must be so great as to project the body up at each step a distance equal to the height of the stair. Whether a man of one hundred and forty pounds gets his weight upstairs by the levers that Nature gave him, or lifts it by a pulley, makes no difference; one hundred and forty pounds are to be lifted through the height of the staircase, at any rate. In walking a distance of eighteen feet, at, say, six steps, and assuming that the centre of gravity of the body is raised an inch at each step, the total effort expended would be equal to raising the body through a height of six inches. But, in ascending a staircase eighteen feet high, the body has to be lifted through thirty-six times this space, with the expenditure of thirty-six times the amount of force; the power

expended would therefore be equal to a level walk of three hundred and twenty-four feet. We thus get a definite idea of the immensely greater consumption of force in ascending a staircase than in ordinary walking.

But the difference is still greater than here appears. We have said that each person has a natural time-rate of stepping, at which force is expended most economically. Two persons of unequal steps will move along together at equal speed, the short and frequent stepping of one being equal to the longer and slower stepping of the other. But, if they join arms, and undertake to "keep step," one or the other must violate the law of oscillation—that is, must swing his pendulums in the wrong time. He therefore walks at a mechanical disadvantage which involves extra exertions, and to that degree a waste of force. But in going up stairs this deviation from the natural movement and the consequent mechanical drawback are very much greater; so that, besides the enormous draft of vital energy for simple lifting, there is a further loss in the disadvantageous way of doing it.

But there is another law of the case which is still more important. In moving a body from one point to another, it is not enough to know how much force is required to overcome weight and friction, but *the time in which it is to be done* must also be taken into account; and, as regards the economy of force, this is by far the most serious thing. The dynamic formula is, not that the moving force must equal the weight of the mass moved, but it must equal the mass *multiplied into the velocity*. And how multiplied? People generally would say that, if the speed be doubled, the force also must be doubled; but this is far from the truth. You cannot double the speed by doubling the force; to double the speed you must double the force *twice*. A duplicate increase of velocity requires a quadruple increase of force. If a railway-train is moving at ten miles an hour, to make it twenty miles an hour requires four times the driving power—hence the great economy of low speed. Physicists assure us that, in raising weights by pulleys or levers, the same principle holds. When, therefore, you run up-stairs in half the time that you would walk up, the draft upon the vital energy is multiplied *fourfold*. Quickening the speed lengthens the staircase; and quickening it a little lengthens it a great deal. Running up in half the time is equivalent to walking up *four flights*.

Running up-stairs is thus an excessive strain upon the constitution; but where does this strain fall? The levers of motion are moved immediately by the muscles; but the muscles cannot act of themselves. Their contractions and relaxations take place only under stimulus; they are all connected by lines of force, called nerves, with the nervous centres, and these are the sources of muscular stimulation. Not that the nerve-force of the brain is converted into the mechanical movement of progression, but nerve-force is constantly drawn upon to maintain the action of the muscles, and this draft is always greatest where there is a sense of exertion. The feelings are muscular stimuli, and whenever excited they press for vent in muscular movement; if much excited, for example, we cannot sit still. Under the influence of an intense emotion, as terror, for instance, men often put forth an amount of power which would be impossible under ordinary circumstances. In running up-stairs, therefore, it is not mere mechanical force that we are expending; there is a wasteful exertion of the highest force of the organism. It takes place at the expense of nervous vitality and cerebral vigor. There is a limited fund of nervous power which is drawn upon by the stomach in digestion, by the heart in circulation, by the glands in secretion, by the muscles in work, and by the organ of mind in feeling and thinking. And this fund of force being limited, any over-draft in one direction takes place at the expense of the others. When bodily vigor is high, the evil result of running up-stairs may not be decidedly felt; but where there is debility of any of the processes, this strain cannot fail to tell in some form or other with injurious effect.

The habit of running up-stairs implies bad calculation. The reason offered in nine cases out of ten will be, that it is to save time. But time must be very precious when we can afford to pay for it in vital energy at such an exorbitant rate. It is better to be deliberate, to take time and economize vital power. It may answer for young people, in their exuberance of activity, to make the staircase a gymnasium; but it is a wasteful folly in others, who, if time must be saved by accelerated motion, had better do it by adopting the trot as the regular pace of the parlor.

The bad practice is, however, in reality, due to incorrect thinking upon the subject. People suppose that, in going up-stairs, there is just so much to be done *at any rate*, and the quicker the task is over the better. But this is a fallacy, and when we undertake to reduce fallacies to practice, we always have to pay the penalty.—*Appletons' Journal*.

Professor Tyndall on Haze and Dust.

One of the most remarkable and, perhaps, one of the most prolific discoveries of modern science, says the *Pall Mall Gazette*, was announced and described by Prof. Tyndall in a lecture delivered at the Royal Institution, January 21. The subject of the lecture, which was illustrated by a series of very beautiful experiments or demonstrations, was the very familiar one of "Dust and Disease," and its object was to show the probability of an intimate connection between atmospheric dust and epidemic diseases. Everybody knows that when a direct ray of sunshine crosses a shaded room, its direction is made manifest by a line of apparent vapor. Looking at this vapor, it is seen to consist of innumerable particles of dust which float in the atmosphere and, catching and reflecting the sunshine, are rendered visible.

In the course of some beautiful experiments on the decomposition of vapors by light, Dr. Tyndall found it to be essential that he should get rid of the floating dust. He strained the air through a tube filled with bits of glass wetted with concentrated sulphuric acid, and through another tube filled with bits of marble wetted with caustic potash, he then made it bubble through the liquid acid and the potash solution, but still the dust particles remained in it. He tried various other ways of straining out this dust, but none of them succeeded. At length he passed the air on its way to the tube over the flame of a spirit lamp, and at once every particle of the dust disappeared. It was, therefore, organic matter, and the flame had burned it.

Passing the air a little more quickly over the flame, a fine blue cloud appeared in the tube—the smoke of the dust particles. The organic and combustible nature of these particles was a discovery, for they had hitherto been taken to be inorganic and incombustible. Air was then passed through a tube which contained a roll of platinum gauze, and it was found that when the platinum was cold, the dust particles all passed through with the air, but that when it was made red-hot, the dust particles were all consumed. In this case, too, when the air was forced quickly through, a fine blue cloud of smoke appeared just as in the experiment with the spirit lamp. An attempt was then made to burn the particles by the concentrated rays of a convergent mirror, but it failed; the particles flitted too quickly through the focus of the burning ray to be consumed by it.

The next experiment was to put the flame of a spirit lamp in the ray of light which was revealing the floating dust. At once the flame was seen to be surrounded by wreaths of darkness, resembling intensely black smoke. On lowering the flame beneath the beam of light the same dark masses were seen wreathing upwards. "They were at times," says Dr. Tyndall, "blacker than the blackest smoke that I ever saw issuing from the funnel of a steamer, and their resemblance to smoke was so perfect as to lead the most practised observer to conclude that the apparently pure flame of the alcohol required but a beam of sufficient intensity to reveal its clouds of liberated carbon." But when a red-hot poker was placed under the beam the same black wreaths came floating through. A hydrogen flame was next put under it, and the whirling masses of darkness wreathed upwards more copiously than ever. The blackness was therefore nothing but air from which all dust particles had been burned out, and which consequently, contained nothing to catch the light and reflect it to the eye as the dust particles do.

Here, however, a difficulty came in. The same effect was produced by a copper ball not hot enough to burn the dust, and by a flask filled with hot water. In this case it was found that the air was rarefied with the warmth, and as the dust particles were not heated to the same extent it dropped them and floated upwards without them. Other gases, even common coal gas, carefully prepared so as to exclude the dust particles, have the same black appearance when they cross a ray which the dust-laden air renders visible, and if coal or hydrogen be let into the top part of a glass shade which has been placed in a sunbeam or a ray of the electric light, the line between dust-laden air and the gas is rendered visible—where the air is, the shade will seem full of the illuminated particles, where the gas is it will appear absolutely empty. "The air of our London rooms is filled with this organic dust, nor is the country air free from its pollution. It only needs a sufficiently powerful beam to make the air appear as a semi-solid rather than a gas."

Nobody could in the first instance, without repugnance, place the mouth at the illuminated focus of the electric beam and inhale the dirt revealed there. Yet we are inhaling it every moment, and the wonder is that so small a portion of it should be injurious to health.

What is the portion of this ever-present and all-pervading dust which is injurious to life? Now, it was long believed that epidemic diseases were propagated by malaria, which consisted of organic matter in a state of motor-decay; that when such matter was taken

into the body through the lungs or the skin, it had the power of spreading in it a similar decay—yeast was a case in point. Why should not a bit of malarious matter operate in the body as a little leaven, leavening the whole lump?

But in 1836 Cagniard de la Tour discovered the yeast plant, which when placed in a proper medium grows and spreads, and produces what we call fermentation. In the next year Schwann, of Berlin, discovered the plant independently. He also proved that when a decoction of meat is effectually excluded from common air, and supplied solely with air which has been raised to a high temperature, it never putrefies. Putrefaction, therefore, he said, came from the air, and could be destroyed by a sufficiently high temperature. Helmholtz and Ure repeated and confirmed his experiments: but the high authority of Guy-Lussac, who ascribed putrefaction to oxygen, drove chemists back on the old notion. That notion was finally exploded by Pasteur, who proved that the true ferments are organized beings who find in what we call ferments their necessary food.

Side by side with these discoveries grew up the germ theory of epidemic disease. Kircher expressed the idea, and Linnæus favored it, that epidemic diseases are due to germs which, floating in the atmosphere, enter the body and produce disease by the development of parasitic life. Sir Henry Holland, has favored this theory, which derives its strength from the perfect parallelism between the phenomena of contagious disease and those of life. As an acorn planted in the soil gives birth to an oak which produces a whole crop of acorns, each of which has power to produce its parent tree, and thus from a single seed a whole forest may spring, so a germ of disease planted in a human body grows and shakes abroad new germs, which, meeting in other human bodies with their proper food and temperature, finally take possession of whole populations. Thus Asiatic cholera, beginning in a small way in the delta of the Ganges, spread itself in seventeen years over nearly the whole habitable world.

An infinitesimal speck of small-pox virus will develop a crop of pustules, each charged with the original poison. The reappearance of this scourge, as in the case of the *Dreadnought* at Greenwich, so ably reported on by Dr. Budd and Mr. Busk, is explained by the theory which ascribes it to the lingering of germs about the infected place. Surgeons have long known the danger of admitting air to an abscess, and abscesses are always opened by an instrument which carefully excludes the air from contact with the wound. The instrument should of course, be scrupulously clean; but it can be made perfectly clean in an atmosphere of dust only by being made as hot as its temper will bear. This is not done, and therefore inflammation often sets in after the first operation; rapid putrefaction accompanies it, and the pus, which at first showed no traces of animal life, is now found to be full of active little organisms called vibrios. Professor Lister, from whose letter this fact is derived, contends that this astounding development of animal life is due to the entry of germs into the abscess during the first operation, and their subsequent development by favorable circumstances. Hay fever is another case in point.

The celebrated physiologist Helmholtz suffers from the 29th of May till the end of June from a catarrh of the upper air-passages, and he has found that during this period, and at no other, his nasal secretions are peopled by those vibrios. They nestle in the cavities of the nose, and a sneeze is necessary to dislodge them. These are uncomfortable statements, but if the germ-theory is found to be true, it will give definiteness to our efforts to stamp out disease; and it is only by some definite efforts under its guidance that its truth or falsehood can be established. Hence Dr. Tyndall says he reads with sympathy such papers as those of Dr. Budd, of Bristol, on cholera, scarlet fever and small-pox. Dr. Budd's imagination may occasionally tempt him to a flight beyond his facts, but without this dynamic heat of heart the solid inertia of the Briton can never be overcome. * * *

Returning to the dust, Dr. Tyndall drew certain practical conclusions from the survey of these two classes of facts. The dust cannot be blown away by ordinary bellows, since the air they send out is equally full of the particles. But fill the nozzle with cotton wool, not too tightly pressed, and the air is filtered, and being then blown across the beam of light, forms a clean band of darkness, like the air from the spirit lamp, or from the heated platinum wire. * * *

The most interesting of all illustrations of this filtering process is furnished by the human breast. Fill the lungs with ordinary air and breathe through a warm tube—warmed to prevent the condensation of the watery particles—across the beam of light which is revealing the dust-particles in the air, the particles move with the moving air, but the current from the lungs shows at first as many particles as the ordinary atmosphere. Gradually, however, the particles clear away from the course of the breath, and by the time you have completed your expiration, the expired air cuts a sharp black line

through the motes in the sun-beam. The air has left its dirt in the lungs, and the last portions of the expired breath are free from floating dust. But empty the lungs as far as possible, and then inhale a deep breath through a handful of cotton-wool, and on expiring this air in the same way it cuts a black hue in the sunbeam at once. Place the tube below the beam and blow upwards, and the air rises through the dancing particle like black smoke, just as it did from the heated surfaces on which the dust was burned. The cotton-wool has completely intercepted the floating matter on its way to the lungs, and as no dust was inhaled, none is exhaled.

Here, then, is the philosophy of an instinctive habit of medical men. In a contagious atmosphere the physician puts his handkerchief to his mouth, and inhales through it: in so doing he keeps back the floating germs. If the poison were a gas, it could not be thus intercepted. Dr. Bence Jones repeated Dr. Tyndall's experiment with a silk handkerchief, with a similar but less marked result. Cotton-wool is, in fact, the best and surest filter, and a physician who wants to hold back from the lungs of his patient, or from his own lungs, the germs by which contagious disease is said to be propagated, will employ a cotton-wool respirator. "After the revelations of this evening," concluded Dr. Tyndall, "such respirators must, I think, come into general use as a defence against contagion. In the crowded dwellings of the London poor, where the isolation of the sick is difficult, if not impossible, the noxious air around the patient may by this simple means be restored to practical purity. Thus filtered, attendants may breathe the air unharmed. In all probability the protection of the lungs will be the protection of the entire system. For it is exceedingly probable that the germs which lodge in the air-passages, and which at their leisure, can work their way across the mucous membrane, are those which sow in the body epidemic disease. If this be so, then disease can certainly be warded off by filters of cotton-wool. I should be most willing to test their efficacy in my own person; and time will decide whether in lung diseases also the woollen respirator cannot abate irritation, if not arrest decay. By its means, so far as the germs are concerned, the air of the highest Alps may be brought into the chamber of the invalid."

Indian Costumes and Material.

It is remarkable that, although the manufacture of textile fabrics arrived ages ago at a high degree of perfection, the art of adapting them to the requirements of the human figure appears to have been long neglected, so that the race of *durries* cannot, we think, trace their craft in India further back than the Mussulman conquest, notwithstanding a great number of them, especially in Southern India, being Hindoos. It may not be irrelevant to observe here that, so far as we can discover, there is no trace in India of the popular European theory that this interesting class is a distinct species of the human race, so peculiar that Queen Elizabeth, when receiving a deputation of eighteen "knights of the thimble," advisedly addressed them in the words "Good day to you, gentlemen both."

Every one in India is so familiar with the ordinary articles of native wearing apparel—their variety is so limited, the articles themselves are so simple—that much description would be superfluous. The chief characteristic of costume throughout the whole East is its immutability. "The Oriental sets his loom after the manner of his forefathers." As the silkworm never alters the fashion of its cocoon, so the native of India never alters the fashion of his apparel. The style of clothing, which is to-day universal, can be shown to be nearly identical with that described in the Institutes of Menu—written 3,000 years ago. The most ancient form of costume is undoubtedly seen in the south of India, where the absence of any seam in nearly every garment is conspicuous.

The universal "chuddar," which, as regards the manner of wearing it, bears such a striking resemblance to the Roman toga, is, perhaps, as simple and graceful an article of clothing as has ever been worn. Being made of every description of cloth, from the finest muslin of Dacca or Nandair to the coarsest and cheapest calico, it is worn by women of all ranks. They indicate their station in life, not by the curious and fantastic forms into which it is thrown, but by the quality of its texture.

The "dhotee," or waistcloth worn by men, has from time immemorial remained essentially the same. It is unmistakably identical with those represented on the walls of the ancient temples of Southern and Western India as worn by Buddha and other divinities, whose effigies no doubt represent faithfully the dominant fashion of their day. This truly national article of dress a native never dispenses with, although as a soldier he may be required to wear the thick regulation trousers over it.

The "dooputta," or scarf, is an exceedingly graceful addition to the dress of women of the higher class. It is generally composed of the very finest material. Those of Benares are preferred on account of their exquisite and intricate arabesque patterns. High-born ladies of the Deccan wearing these often affect a Persian style of costume using also a "chuddar" sewn and shaped to the figure, beside wreaths and other Persian hairdresses.

"No veil to curtain o'er her beauteous brow,
In its young bashfulness more beauteous now;
But a light golden chain wore round her hair
Such as the maids of Yezd and Shiras wear."

These maids of Yezd were great authorities on questions of fashion in their day; and their notable beauty gave rise to the Persian proverb, "To lead a happy life, one must have a wife of Yezd." To adorn their black tresses with the blossoms of the gold-coloured champac was also a favorite "mode" among Indian ladies of a bygone day. The same poet alludes to it:—

"The maid of India blest again to hold
In her full lap the champac's leaves of gold,
Thinks of the time when by the Ganges flood
Her little playmates scattered many a bud."

For ages it has been the honoured practice of native women of the highest rank to spin with their own hands. Many of them might be pleased to hear that the greatest lady in Europe, and their own Empress, countenances this graceful amusement by practising it herself.

Many Indian fabrics, though still made by the same rude instruments which were employed thousands of years ago, rival and even excel any similar fabrics produced at the present day by the most elaborate machinery of Europe. The muslins of Dacca and Arnee seem to have arrived at a degree of excellence which cannot be surpassed. A few of the details concerning its manufacture at Dacca, given by Dr. Watson, are instructive. "The Dacca spinners usually work from soon after dawn to nine or ten o'clock, and from three or four in the afternoon till half an hour after sunset. The finest yarn is spun early in the morning, before the rising sun dissipates the dew on the grass; or, when this is wanting, and the air is unusually dry, it is not unfrequently made over a shallow vessel of water, the evaporation from which imparts the necessary degree of moisture to the filaments of cotton, and enables the spinner to form them into a thread." To prove how fine the yarn is, which is thus so carefully spun, "Mr. Taylor mentions that one skein which was carefully weighed proved to be at the rate of 250 miles in length to the pound of cotton." And Dr. Watson, who himself examined English, French, and Dacca muslins under the microscope, discovered that the diameter of the Dacca yarn was less than that of the finest European. The muslin manufactured at Arnee, near Madras, is, owing to its greater transparency, preferred by the natives. The process of moistening the skein here is very peculiar, owing to the dryness of the atmosphere:—"The spinners, who are male as well as female, work in partially darkened rooms, the floors of which are watered to produce the necessary amount of moisture."

The chintzes of Masulipatam and other towns in the south of India are greatly superior to any we can produce; the chaste and tasteful patterns are a striking contrast to our gaudy, ungraceful designs. Our limited space will not allow us to speak of the kinkhabs, the mushroos, the hemroos, and the shawls of Delm and Cashmere, but it would richly repay our merchants at home to study more carefully the precise nature of the demand in the Indian market. If they hope to compete with the native producer, they must thoroughly understand the tastes and requirements of the people." To attempt the introduction of the slightest novelty or variation is useless; correct reproduction must be their aim. Hitherto the efforts of the English cloth manufacturer have not been attended with success. The explanation of this is that the imitated articles were not copied accurately, did not perfectly suit the purpose required, and were therefore rejected by the natives. The people cling to the associations and symbols of the immemorial designs of their country. "We may never supplant the Indian handloom weaver; but we may at least compete with him in many simple articles of attire, which, if even moderately successful, would give an impetus to our own productions of which it is impossible to estimate either the amount or the importance."—*Delhi Gazette*.

OFFICIAL NOTICES.



Ministry of Public Instruction.

APPOINTMENTS.

SCHOOL COMMISSIONERS.

The Lieutenant Governor by an Order in Council dated 29th ult., was pleased to appoint the following Gentlemen School Commissioners for the following Municipalities:

St. Eulalie (New Municipality), Co. of Arthabaska: Messrs. Maurice Desfossais, Onésime Caron, Jude Arsenaull, Alexis Rhéault, and François Décoteau.

St. Siméon (New Municipality), Co. of Charlevoix: Messrs. François Harvey, Antoine Boucher Belleville: Scraphin Guérin, Côme Harvey, and Narcisse Savard.

Chester (West), Co. of Arthabaska: Mr. Joseph Lallier, in the room and stead of Mr. Olivier Leblanc, removed from the Municipality,—no election having been held within the legal time.

East Clifton, Co. of Compton: M. Octave Courtemanche, in the room and stead of Mr. Bart. Blossom, removed from the Municipality,—no election having taken place within the legal time.

St. George de la Malbaie, Co. of Gaspé: Messrs. Louis Dumas, François Cabot and William Mercier, in the room and stead of Messrs. John Buckley and Thomas Tapp, removed from the Municipality,—and Edward Mercier, deceased,—no election having taken place within the legal time.

St. Lambert de Lauzon, Co. of Lévis: Mr. Amable Samson, in the room and stead of Mr. Paul Jallient, removed from the Municipality, no election having taken place within the legal time.

St. Paulin, Co. of Maskinongé: Mr. Edouard Plourde, in the room and stead of Mr. Honoré Plourde, removed from the Municipality,—no election having taken place within the legal time.

Onslow, Co. of Pontiac: Messrs. Peter Regan and William Thompson, in the room and stead of Messrs. Benjamin Morne and William Kelly, retired from office,—no election having taken place within the legal time.

Stoneham, Co. of Quebec: Messrs. John Wilson and Joseph Paquet, in the room and stead of Messrs. Joseph Kavanagh and Patrick Devine, removed from the Municipality,—no election having taken place within the legal time.

SCHOOL TRUSTEE.

St. Hyacinthe, Co. of St. Hyacinthe: Mr. Orpheus F. Barnes in the room and stead of himself,—the election not having taken place within the legal time.

SEPARATION AND ANNEXATION.

The Lieutenant Governor, by an Order in Council dated 29th ult., was pleased by virtue of the powers conferred on him by Clause 31, Cap. 15, Consolidated Statutes for Lower Canada, to order that Lot number one of Tingwick be annexed to Chenier for School purposes.

DIPLOMAS GRANTED BY BOARDS OF EXAMINERS.

PONTIAC BOARD.

Session of February 1st, 1870.

ELEMENTARY SCHOOL DIPLOMA, (E.) 2nd Class:—Messrs. John Maccauley, William Craig, and Miss Elizabeth McKnight.

OVIDE LEBLANC,
Secretary.

BONAVENTURE BOARD.

Session of February 1st, 1870.

ELEMENTARY SCHOOL DIPLOMA, 1st Class:—Messrs. John Alfred Le Gendre, (F. & E.) and John Perry, (E.).

J. A. LEBEL,
Secretary.

BEAUCHE BOARD.

Adjourned Session of March 3rd, 1870.

ELEMENTARY SCHOOL DIPLOMA, 1st Class:—Mr. David Bridge, (E.) and Miss Marie Lessard, (F.).

2nd Class (F.):—Miss Anathalie Rhéaume.

J. T. A. PROULX,
Secretary.

THE JOURNAL OF EDUCATION.

QUEBEC, PROVINCE OF QUEBEC, APRIL, 1870.

Filling up Vacancies in School Boards.

As much confusion frequently ensues in the organization of School Boards, regarding the time at which members are required to retire from office and the manner in which vacancies should be filled up, we would impress upon all concerned the necessity of paying strict attention to the following requirements of the law:

1. After a first or general organization of a Board of School Commissioners in a Municipality, whether by election, or appointment by the Lieutenant-Governor in Council, two of the five Commissioners so elected or appointed are to be balloted out of office during the ensuing month of July (as indicated in Chapter 15, Section 50, of the Consolidated Statutes for Lower Canada), no matter at what time the Board may have been organized; two of the remaining three are in like manner to be balloted out of office during the month of July in the following year; and the fifth or remaining Commissioner retires (of course without balloting) during the month of July next following. Thus, two of the five original members of the Board are bound to remain in office during one year only (the time which shall have elapsed from the date of organization to the date at which their retirement takes place in July, as above specified, being reckoned as the *first* year), two remain in office two years, and one (the fifth) remains during the full term of three years. The Chairman is liable to be balloted out of office in the same way as the other Commissioners.

2. After the expiration of the first three years, each of the five members of the Board remains in office during the full term of three years and retires without balloting; those who are to retire being indicated by the time during which each shall serve,—to be reckoned from the first Monday in July of the year within which he shall have been elected.

3. The regular annual vacancies thus occurring, after the first or general organization of the Board, must be filled up immediately, in the manner prescribed in the Statute, Cap. 15, Sec. 35.

4. All the provisions of the law referred to above apply equally to the Trustees of the Dissident Schools, except that, as regards the first three years, from and after the original or general organization of their Board, in each Municipality, one only of the three members constituting such Board is balloted out of office at the end of the first year (or term reckoned as the first year, that is, in July then ensuing), one more is balloted out at the end of two years, and the third or remaining member at the end of three years. The vacancies are to be filled up regularly as they occur, as with the Commissioners. After the first three years above specified, each Trustee is bound to serve during the full term of three years from the first Monday in July of the year within which his election shall have taken place.

5. When the elections have not been held in accordance with the provisions of the law or when the retirement from office has not taken place or when the vacancies have not been filled up as prescribed, it is necessary that the School Commissioners or

Trustees, or their Secretary-Treasurers, should report the fact to the Minister of Public Instruction, and they should at the same time recommend the person or persons to be appointed by the Executive in order to legalise the organization of the Board.

6. As to any casual vacancy which may be occasioned by the death of a School Commissioner or Trustee, or by his *permanent* absence from the Municipality, or when he becomes incapacitated through illness or infirmity, it should also be filled up immediately as it occurs, in the manner required in Section 47 of said Chapter 15; but when there has been no one elected by the ratepayers to fill up such vacancy within one month of its occurrence, the fact should at once be reported to the Department, and a fit and proper person recommended for appointment, as well as the cause which led to the vacancy stated.

7. Commissioners and Trustees appointed to fill *casual* vacancies—that is, vacancies occurring under the provisions of Section 47 of said Chapter 15—and also vacancies within the meaning of Section 42 of the same Chapter, remain in office only during the unexpired term of those whom they were appointed to replace.

8. In reporting vacancies it is important that the *dates* at which they may have respectively taken place should be given, with the *christian* and *surname* of each out-going member and of his successor or of the person recommended as such, as the case may be.

9. *Names and qualifications* should always be given in full.

10. The election returns should be transmitted to the Department before the 1st, September of each year.

11. Secretary-Treasurers are held to give notice, to the Department, of any change which has taken, or may take, place in the composition of the Boards of Commissioners or Trustees.

12. By order of the Minister of Public Instruction the Grant will be withheld from any Municipality not complying with articles *ten* and *eleven*.

McGill University.

MEDICAL FACULTY.

The address of Dr. McCallum, at the late convocation of the McGill University, Medical Faculty, although intended for the especial benefit of the medical graduates, is full of happily expressed ideas and counsel, applicable to all classes of students and young men going forth to commence the "battle of life." We therefore give it in full as well as the address of the Vice-Cancellor, Dr. Dawson, delivered on the same occasion.

Dr. McCALLUM delivered the following address:—

Gentlemen, Graduates in Medicine.—"The winning of honour," says Bacon, "is but the revealing of a man's virtue and worth, without disadvantage." The honour which, for a period of four years, you have manfully striven for and at length creditably won, and which has this day been conferred on you, is one that demands on the part of those who would successfully aspire to it the manifestation of qualities, both mental and moral, of no common order. Your success, therefore, reveals to your friends and to society at large that you do possess those intellectual qualities, that virtue and worth which, if you continue to exercise them in future as you have heretofore, will certainly succeed in winning for you the esteem of honorable men, and make you useful members of the profession of your choice. Of all the modes in which men employ their time and energies, there are few more elevated in their aims or more beneficial to mankind than the practice of the healing art. We may say, in truth, that there is but one other profession which excels that of the human healer; and it does so, simply because it has for its object the present culture and well-being, and the future safety and happiness of man's undying self. One of the greatest and most original thinkers of the present day, however, places medicine above all other professions; thus, Carlyle, in his "Latter day pamphlets," observes that "the

profession of the human healer is radically a sacred one and connected with the highest priesthood, or rather being itself the outcome and acme of all priesthood and divinest conquests of intellect here below." The great object of medicine is to combat disease—and what does this signify? Firstly, That it is a profession which requires its members to be furnished with knowledge of the most extensive and recondite character. They must know the physical man thoroughly—the wonderful intricacies of his intimate structure, and the marvellously complex operations that are being carried on in every part of his organism. They must have studied also man's mental constitution, and be able to recognize the presence and estimate the value of mental influences in life processes and their derangements. The infinite variety of the cause of disease, whether existing in man himself, in the air he breathes, the food he eats, the water he drinks, the textures with which he clothes himself, or in the earth upon which he walks, must be familiar to them. They must have a perfect acquaintance with the physiognomy of disease and the traits and character by which it reveals its presence. They must know, also, the means which a Beneficent Providence has placed within their reach for the removal of disease, and the restoration of the aberrant functions to their normal condition; and which means have been discovered, elaborated and perfected, by the research, perseverance and ingenuity of man himself. Much of this knowledge you have already acquired, but the fund is practically inexhaustible, and were you to live beyond the time allotted to man and devote every spare moment to close research and study, you would only appreciate the more clearly how limited any one individual's acquirements and experience must be in a liberal profession with the multiplied actualities and infinite probabilities of medicine. Secondly:—That it is a profession which demands from its members the greatest devotion and self-denial. Duty is frequently a strait and rugged road. Pleasant indeed are the bye paths of leisure and amusement, and especially tempting are the cool retreats of listless indifference. The man struggling forward in his life journey, often fretted and wearied with the difficulties that beset him in the prosecution of his aims and aspirations, would fain turn aside and seek relief in the levity of the one, or in the stagnation of the other. Let him yield to the temptation, however, and no matter how fair may have been his prospects of success at the commencement of his career—no matter how richly he may have been endowed with natural gifts—failure, miserable and dishonouring failure, is inevitable. Success in any of the great objects of life is not to the idler, the trifler or the dreamer. It comes not in obedience to a wish, and cannot be acquired by a waking dream. In this active and restless period of the world's history, a man, to succeed must be up and doing. He must apply himself with singleness of purpose to do his duty in whatever he undertakes, undeterred by the obstacles which may obstruct his way, and which often appear to be insurmountable until they are encountered and go down before a resolute and unyielding will. The world is apt to measure a man's abilities by his successes, and although the rule by which it judges cannot be admitted as an infallible one, there are solid grounds on which this worldly decision rests. To be fortunate, as the term goes, is often the result simply of a knowledge of all the means necessary to attain to a certain object, and the prosecution of these with thorough devotedness. Cardinal Richelieu was wont to observe, that "unfortunate" and "imprudent" were two words for the same thing; and we may reasonably infer, therefore, that this distinguished and keen observer of human nature considered good fortune to be the result of prudent management, or in other words, that success is the indication not only of the man's abilities but also of his command over, and proper regulation and direction of, these abilities. In the profession of medicine, gentlemen, to become a successful healer of the sick, which should be the great and dominant desire of each one of you, there can be no trifling with duty. You have not attained the position in which you stand to-day without having learned the important part, that there is no easy road to learning. The knowledge, scientific and practical, which you evinced during your recent examinations, and which has been the warranty of this University in conferring upon you the Degree of Doctor in Medicine and Master of Surgery, has not come to you intuitively. It has been acquired by much hard work, by unremitting devotion to your studies, and the frequent practice of self-denial. Now the same hard work—the same unremitting devotion to study, and the same practice of self-denial, will be imperatively demanded when you go forth into the world and assume the responsibilities of practitioners of medicine. Without them you can never be *thorough*; and thoroughness is certainly of the highest importance in a profession, the great mission of which is to preserve human life. Thirdly.—That it requires its members to manifest the purest and most unselfish heroism. Men have been long accustomed to associate all ideas of heroism with exhibitions of mere animal courage. To plunge recklessly into

the *melee* of deadly strife, and, amid the maddening excitements of roar of cannon, charge of cavalry, shouts of contention, and groans of the dying, to perform prodigies of valour by freely destroying human life, is to manifest qualities which nature and individuals delight to possess. Thanks from the associated wisdom of a grateful nation—the highest titles and positions in the land—public honors and a name in history, have always been awarded to the successful military hero. Philosophers and philanthropists, the men of mind and men of heart, have in all ages, however, recognized a species of heroism of vastly higher character, but which the public generally have held in light esteem. This heroism is not demonstrative, it has no bold and glaring points to arrest the attention of the beholder—it does not dazzle his eyes by its brilliancy; it is not accompanied by pomp and parade, the sound of the trumpet, the martial roll of the drum, the neighing of the war horse—is not clamorous for distinction, is not heard afar off, nor does it boldly intrude on the notice. Quietly, unobtrusively and perseveringly it pursues its course. Of such nature is that heroism which the physician is so often called upon to exhibit. When death stalks abroad in the land; when the pestilential breath of a fatal epidemic breathes destruction in every household; when the wail of bereaved ones strike fearfully on the ear; when the hearts of strong men, who would in time of excitement rush even to the cannon's mouth, fail them, and terror is depicted on every countenance, who is that remains calm and unmoved amid all the dread and turmoil—that them, and terror is depicted on every countenance—who is it that speaks words of encouragement and comfort to the fearful and down-cast—that with a moral courage shrinks not, and a high sense of duty, toils day and night to relieve suffering humanity? Who is it, in a word, that takes his life in his hand, and when friends and relatives even forsake the couch of the plague stricken one fearlessly attends to his every want? Who? Is it not the devoted, heroic physician? The physician engaged in the duties of his profession during the prevalence of a fatal epidemic, is a noble sight, and one that might engage the attention, and command the admiration of beings superior to man. How the people, leaning on his every word, eagerly scan his countenance and bless him for his unwearied care. Danger past, however, his arduous and benevolent efforts are all forgotten, and if, perchance, he should have fallen a victim to over exertion, a martyr to a conscientious discharge of his duties, his very memory fades in a few brief days from the recollection of those whose lives he has saved. No monumental marble is reared to stand the record of a people's sorrow for his death; no "storied urn" tells of his acts of bravery and untimely end; the historian's pen hands not his name down to posterity. Such is the ingratitude of man and such is his estimate of *true heroism*. When occasion demands, gentlemen, that you should expose your lives for the purpose of giving relief to diseased and suffering humanity, I am confident that you will not be found wanting; and that the fearlessness with which at all times the members of your profession have confronted death in some of its most revolting forms, will be emulated by each one of you. "He who gives himself to the study and work of medicine," says the great and good Sydenham, "ought seriously to ponder on this thing; that as he is himself not exempted from the common lot, and is liable and exposed to the same laws of mortality, the same miseries and pains as are all the rest; so he may endeavour more diligently and with a more tender affection, as being himself a fellow-sufferer, to help them who are sick." In all your relations of life *be true and loyal*. Truth and loyalty are two great characteristics of the gentleman—by which term I do not mean the conventional gentleman, who may be defined simply, a unit of the male sex well dressed and with nothing particular to do; but that man of sterling worth, who may be met with in every rank of life, whose heart vibrates toward truth as constantly and as naturally as the needle does towards the north pole, to whom a mean and unworthy action is simply impossible because of his innate nobleness of character, and of whom it may be said in the truest sense of the term—*noblesse oblige*. Be loyal to your Queen to that wise and gracious Sovereign whom Providence has appointed to reign over us, and under whose benignant and constitutional sway the peoples of this mighty empire have enjoyed the blessings of a true and enlightened freedom, who has endeared herself to her subjects by the eminent virtues which have adorned her character, and who has commanded the loving admiration and esteem of every good man and woman throughout the civilized world, and made the throne of Great Britain, glorious as in itself it is, still more glorious by her wifely and motherly devotion. May the Supreme Ruler of events spare her Majesty's life (in the words of the National Anthem)—

"Happy and glorious,
Long to reign over us,
God save the Queen!"

Be loyal to your country. You should acquaint yourselves with so much of the politics of your country as to be able at all times to take an intelligent part in public affairs. With questions relating to her material interests you need not concern yourselves more than members of the community generally, as there appear to be not a few with more leisure time, who are willing to attempt their solution and to sacrifice themselves, as they are pleased to say, for the benefit of the country. What is of more worth in your province, however, is to throw the whole weight of whatever influence you may possess in favour of every measure which has for its object the moral elevation of the community; and to aid in establishing laws, both local and general, for the preservation of health and the prevention of disease. Whatever position these confederated provinces are destined to assume among the community of nations, I am certain that we, and those who follow us, will be always found to stand firmly by the old flag so long as it remains what it is—the emblem of free thought and free speech wherever it is unfurled—the banner of a constitution which protects its people from the tyranny of one—the tyranny of a few,—or, what De Tocqueville correctly affirms to be the most intolerant of all tyrannies—the tyranny of the majority. We have the deepest affection and respect for the grand old historic mother country—the land of our forefathers—the cradle of liberty—the nursery of nations—the hope of civilization, and the star of promise to the wise and silent watchers, who hold their souls in patience and yearningly look for the advent of freedom to the down trodden peoples of the earth. She has watched, over and protected our infancy and youth and now that she is about to throw aside the leading strings and, in our budding manhood, to let us try what there is of mettle in us, our hearts turn lovingly to the "old home." The relations between us may be altered, but we can neither forget our origin nor our obligations; and it is the dearest and most cherished wish of every loyal Canadian, that this Dominion may always form one of the great British family circle. While, therefore we work heart and hand, as becomes sons of the soil, to advance, this our native country, let our motto be—Canadian progress and British connection. Be loyal to your profession. The respect which will be accorded to the profession of medicine, and the position which it will assume in this Dominion will depend greatly upon the conduct of its members. The wrong doing or unprofessional conduct of many individuals within its pale cannot alter in the least its high and honourable character; but it certainly may have the effect of lowering the dignity of the profession before the public. One of the great causes of professional disloyalty and abounding quackery is to be found in the error which is committed by many young physicians in supposing that medicine is a money making profession. They are not long in practice before they become undeceived, and then, if they be not true and honorable men, they are liable to have recourse to various questionable methods with a view of gaining popularity and increasing their income. If the acquisition of great wealth be a leading desire with any one of you, this profession does not offer you a fair field. The most that the diligent and hard working practitioner can reasonably expect as the result of years of toil, is a sufficient though moderate competency. And this is more certain to be acquired by those who quietly attend to their duties and remain firmly attached to the principles of their profession, than by those who court notoriety and endeavour to obtain practice by irregular and unprofessional means. "It must be considered," however, as Mr. Paget has observed, no small happiness to have a calling in which success can be reckoned by something else than by money. Mere money making is no evidence that a man has done any thing respectable, or has gained any thing at all worthy of his labour, and thence, probably, it is that the most honourable professions are those in which, for the most part, services are scarcely rewarded with money, or certainly not according to the scale which mere money makers would think adequate.—Be loyal to yourself—at all times be guided by the promptings of your better self. Frequent and fierce will be the contests for the mastery over your thoughts and actions, between the two great antagonistic principles of your nature—the good and the evil. Victory will certainly not always be in favour of the former. An infinitely greater and a better man, I may safely say, than either you or I will ever be, exclaimed in torturing perplexity of mind. "The good that I would, I do not; but the evil which I would not, that I do. When I would do good, evil is present with me." If, however, you apply for aid to the source from which the great apostle of the Gentiles obtained the strength which enabled him to overcome the difficulties that beset him, and even to conquer self, you also may overcome. Human nature is fearfully weak. The Divine is omnipotent. Earnestly cultivate the line of right and truth. The moral part of man's nature is as capable of being strengthened and developed by exercise in the right direction, as in his mental or physical part. Let a man persistently think the right thought, and persistently do the right action, and he

gradually acquires a moral strength, a power to resist evil, that will stand him in good stead when the hour of temptation comes. At all times, and in every thing, endeavour to square your conduct towards your fellows, by that golden rule which eighteen centuries ago fell from the lips of the Divine teacher—which has come down to us through the ages, but which the ages have practically ignored—"Whatsoever that men should do to you, do ye even so to them."

In conclusion, gentlemen—with a full sense of the great responsibilities that your profession imposes on you, and with brave hearts, resolved to do your duty faithfully and manfully, go forth from this hall and enter upon your career; and that your career may be successful in every respect—that it may be one, of which your best friends may be proud—and especially one, on which you may hereafter look back with those feelings of pleasure and satisfaction which the contemplation of a well-spent life always affords—is the sincere and heartfelt wish of every member of this Faculty.

Dr. DAWSON, the Vice-Chancellor, then said:—Mr. Chairman and Gentlemen of Convocation:—As it is probable that I shall be absent from the closing meeting of the Convocation in May, I desire to take this opportunity to make a few remarks as to the present condition and prospects of the University in some of its departments. Our number of students in the past session has not been so large as in previous sessions, though in numbers 242 in McGill College, and 22 in affiliated colleges, being 264 in all, without reckoning the teachers in training in the Normal School or the pupils in the High School. The diminution has chiefly occurred in the faculties of Medicine and Law, and is attributable to hostile legislation in Ontario, tending to place difficulties in the way of students of medicine pursuing their studies elsewhere than in that Province; and to the extraordinary action of one of the Universities in that Province, which has affiliated schools of law and medicine in this city, over which it can have no effective control, and over which it is doubtful if its charter gives it any jurisdiction. These causes must, however, be temporary in their effect, and will inevitably work out their own cure. I may also refer to the fact that arrangements have been entered into with the Commissioners of Schools to transfer to them the control of the High School, so long managed by this University. It is desirable that this old and useful city school should no longer be an appendage to the University, but should constitute the head and crown of our city system of schools. We have every confidence that while more immediately connected with the common schools, and enlarged in its usefulness as a place of commercial education, it will be still more fruitful than heretofore in well-prepared students for the University. New and more permanent provisions have been made for the Normal School. While it has become necessary, in the interests of the University, that I should close my connection with it as Professor and Principal, I shall still remain in close relation with it in the capacity of Vice-Chancellor; and the corporation will still, as heretofore, be associated with the Minister of Public Instruction in its management; while we can all have the utmost confidence that the new Principal, who has so long been connected with the cause of education in this Province, will most efficiently discharge the duties which have devolved on him. The Protestant people of Quebec justly hold this University responsible for the due performance of the great work confided to the school, and I am sure that they will not be disappointed. The Board of Governors, have again brought the wants of the university before our friends with the view of obtaining additional subscriptions to its endowment fund, for scholarships and other important objects. When I first became connected with this University in 1855, it was with a feeling of disappointment and of depression, that I became aware of the limited amount of its resources in view of all that was required to be done. Only a portion of Mr. McGill's estate was yielding revenue, and there was nothing to reckon upon but a small legislative grant, the continuance of which was uncertain. There were some traditional undefined claims of the Board, on the Government, good in equity, and which would have been weighty in the minds of men desirous of advancing the cause of higher education, but which were of no value as arguments with men reluctant to give.

In the first session of my residence in Montreal, I spent my Christmas vacation at Toronto, then the seat of Government, in urging these claims; but beyond some steps toward the establishment of Normal Schools and some encouragement and counsel from our warm and constant friend, Sir Edmund Head, the visit resulted in nothing. Our first substantial relief came from the citizens of Montreal, in their subscription in the winter of 1856, to the amount of \$60,000, to add to the endowment of Mr. McGill. Of this subscription our Chancellor, Judge Day, was the originator and most ardent promoter. In that subscription the gift of the brothers Molson of \$20,000 to endow the chair of English literature, occupies the most prominent place, and forty-six other citizens of Montreal, representing all the non-Catholic denominations of the city, contributed the remainder. It was

the subscription of 1856 that first enabled the University to organize its Faculty of Arts in a permanent manner. Another great impulse was given by the erection of this Hall and the completion of the College building as a further donation from Mr. W. Molson, whose aid to the cause of higher education should ever render his name dear to the young men of Canada, and to all who regard with interest the promotion of education and science in this country. The sales two years ago of the remainder of the McGill estate have so far improved the financial condition of the University as to place it in a condition of comparative safety. We ask another subscription because we feel ourselves in a position to make good use of additional means. The amounts which we have received fall far short of the sums required for the support of even the less important Universities and Colleges of the mother country and the United States. In carrying on the work our expenditure treads so closely on our income that at intervals a formidable deficit causes us to retreat rather than to advance. We have the prospect that the scanty aid hitherto given by the Province of Quebec must be reduced. We are unable to compete with other universities in Canada in offerings of scholarships and other aids to deserving students. We cannot enter on the fields opened up by the growing demand for educated young men to introduce practical science into the management of public works, mines and manufactures. Our library, apparatus and museum require far more than we can do for them; so do our buildings and our grounds. We are desirous that the University of Montreal should be worthy of this great community and should not only grow with its growth, but like the trade of Montreal should extend its connections to all parts of the Dominion. The English population look to this city as the only great community of their race able to sustain an institution of the higher learning, and upon the maintenance of such an institution depends the position of the English of the Province of Quebec. It is not a small matter to the city that it should take the leading place as a centre of education, and that it should be able to attract hundreds of young men annually to its university, who may trace to the advantages offered here their success in after life.

For these reasons we appeal with confidence to the good sense and liberality of the English and Protestant community of Montreal. Already I reckon upon the endowment of three Chairs, besides a large addition to our general funds, and the ten scholarships given by Mr. W. C. McDonald would alone give a great impetus to our work by attracting and assisting deserving and talented young men to whom we have heretofore been unable to give any assistance. One of our benefactors, informed me that he proposes to endow our Chair of Natural Philosophy with twenty thousand dollars. Sir W. E. Logan has made a beginning of the endowment of a Chair of Geology; and, adding all the sums for the general fund, the subscription, realized within the last few weeks, already exceeds that of 1856.

I am not aware that results so important have anywhere been secured with so small expenditure as here, and we are asking what in most countries would be regarded as a very small additional endowment. With an additional capital of \$150,000, we pledge ourselves to keep this University for the next ten years abreast of any of those of the United States or this Dominion, and largely to increase the number of those receiving its benefits. Special encouragement is offered to such donations by the history of the McGill endowment itself. It was not large compared with the Montreal of to-day, but it was very large relatively to the little town of 15,000 inhabitants, which then represented Montreal. Its application to the interests of education was long retarded, but it remains to this day a fruitful source of good, continually growing in extent and importance. It was the means of securing the appointment of the Board of Royal Instruction and thus of the first public school system in Canada, the germ of all subsequent systems. It was long the sole dependence of the English of Lower Canada for the higher education. It has, in later times, served as a nucleus around which other benefactions have gathered; and thus accumulating, it is to-day represented by this great and flourishing University, by many hundreds of graduates scattered throughout Canada, and by an indirect action on the cause of school education, to which we owe much of the large educational facilities of every kind at present existing. Who can measure the benefits to Canada of this sum of \$30,000, or estimate the good that will flow from it in the future, if it continues to gather to itself as it goes on in our history the subsidiary streams of liberality from successive generations.

The close of the thirty-seventh session of our Medical Faculty, with one hundred and forty students in attendance on its classes, and twenty-nine doctors of medicine going forth from it to day to practice the honourable and most useful art of healing, and to raise the number of our medical graduates to five hundred and fifty, is an occasion of congratulation and thankfulness. It is a still further ground of hope and rejoicing, that there is prospect of the Faculty of Medicine being

provided with a suitable building, fitted up for teaching, study and research. It is a subject of regret that this cost must fall to too large an extent upon the Medical Faculty, the College being able to give little more than a site for the building. No institution in Montreal deserves better of the city than the Medical Faculty, which has now for 37 years sustained its reputation, with little aid from the University and none from the city, which has furnished to Canada a large proportion of its best medical practitioners. It is time now that its external disadvantages should be removed.

My necessary absence from the city will prevent me from attending the meeting of convocation in May, but the duties I have usually performed will devolve on the valuable Vice-Principal; and I hope to gather in my absence much that may become valuable for the future growth and welfare of the University.

On behalf of the Faculties of the University, I beg to thank our friends who have honoured us with their presence here to-day, and especially His Royal Highness Prince Arthur, in whom we recognize, not only a representative of our royal house, and of the educated young men of the mother country, but one whose own kindly and generous sympathy with the young men of Canada in their efforts to attain to the higher walks of literature and science, shows him an heir of the virtues and talents of our beloved Queen and of the good Prince Albert.—*Herald*.

Annual Meeting of the McGill Normal School Literary Association, Montreal.

The annual meeting of this Association was held in the Hall of the McGill Normal School on Thursday evening, 31st, ult., and was, as usual, very largely attended, numbers who came late not being able to gain admittance. The proceedings opened with a chorus by Offenbach, "Welcome to Morning," which was very well rendered, after which the President of the Association, Miss Hart, made an address, in which she thanked the large audience for their attendance, and spoke of the nature of the Association, its objects, and its success on similar occasions, and then called upon Miss Millen, the Secretary, to read the report, in which were detailed the various meetings of the Association, and the work which had been done by the members since the opening of the session. The following is a programme of the evening's entertainment, by which it will be seen that it comprised original prose and poetical compositions by the members of the Association, recitations from the best English authors, and vocal and instrumental music:—

PART I.

1. Chorus—"Welcome to Morning,"—(Offenbach.)
2. President's Address - Miss Hart.
3. Secretary's Report—Miss Millen.
4. Instrumental Duet—Aria from "Bohemian Girl," (Balfe)—Misses Sturrock and Fallon.
5. Literary Wreath—Editress.
6. French Essay—"L'Aurore du Soleil,"—Miss Sicotte.
7. Vocal Duet—"Let me be near Thee," (Weiss)—Miss Williamson and Bourne.
8. Recitation—"Edinburgh after Flodden,"—Miss Rexford.
9. Essay—"Less known British Authors," (Miss Cribb)—Miss Bourne.

PART II.

1. Chorus—"Evening Song"—.....
2. Essay—"Female Authors," (Miss Craig)—Miss Smith.
3. Literary Wreath—Assistant Editress.
4. Instrumental Duet—"Il Trovatore"—Misses Hunsaker and Yates.
5. Recitation—"Maud Muller"—Miss Millen.
6. Essay—"Canadian Scenery"—Miss Lawless.
7. Vocal Duet—"All things are Beautiful"—Misses Hunsaker and Williamson.
8. Recitation—"Good news from Ghent to Aix"—Miss Craig.
9. Piano Solo—(Mozart) Miss Fuhrer.
10. Dialogue—"Mrs. Daffodil and Friends"—Misses Boa, Rexford, Bourne, Pearson, McDonald, and Fallon.
11. Instrumental Duet—Waltz (Strauss)—Misses Fuhrer and Yates.

At the conclusion of the programme, every part of which seemed to be highly appreciated by the audience, who testified their approbation by frequent applause, Dr. Dawson, Vice-Chancellor of McGill University, congratulated the students upon the success of their entertainment, and said he was glad to find such a patriotic feeling running through the whole of their productions. He said that he felt a great interest in the work of the Normal School, and although he had relinquished the position he had held for a long time in connection with it, he had not entirely left it, but that he should do all

in his power to promote its interests. He said he felt that those who now had the management of the school would act for its benefit, and that he would on all occasions, when needed, give it his assistance. He wished the students success at the close of the session, and trusted that on his return from England, whither he was about to go, he should find many prepared to leave the Normal School, after a successful prosecution of their studies.

We may add that the Hall was most tastefully decorated for the occasion, being decked with evergreens hanging in festoons from pillar to pillar. Over the platform hung the flags of England, France and the United States, above which was the motto, worked very beautifully in colored paper, "Surgo ut Prosim."

The proceedings were brought to a close at about half-past ten by the singing of the National Anthem.

We cannot let pass the opportunity of congratulating the members of the Association upon the very marked success of their entertainment, which, besides gratifying their friends, does credit to themselves, and evinces an interest on their part in the welfare of the institution to which they belong that augurs well for their future success.—*Gazette*.

School of Art and Design, Montreal.

ANNUAL EXAMINATION.

The annual examination of the students of the Montreal School of Art and Design was held, 1st, inst., in the school room in the Molson's Bank Building, Mr. Henry Bulmer presiding. His Worship the Mayor, after making an eloquent address, presented prizes to the following successful competitors. The medals were manufactured by Harper & Charles, and in design and execution are equal to the best English productions. Among those present were N. B. Corsey, Esq., G. W. Weaver, Esq., F. B. Mathews, Esq.

ARCHITECTURAL DRAWING.

Louis Allard, first prize, silver medal; Alphonse Dubé, 2nd; James Richard, 3rd.

PRACTICAL GEOMETRY.

W. M. Dow, silver medal; A. Meyer, 2nd prize; Louis Allard, 3rd.

FREE HAND DRAWING.

First Class—John Leslie, silver medal; W. D. Keane, 2nd prize.
Second Class—D. J. Booth, 1st prize; Stephen Crosbie, 2nd; D. O'Connell Doherty, 3rd.
Third Class—P. C. Small, 1st prize; W. Castle, 2nd do; John Roberts, 3rd;—Kincaide honorable mention.

MECHANICAL DRAWING.

First Class—W. M. Dow, special prize.
Second Class—Alfred Grenier, 1st prize, silver medal; C. H. Gilmore, 2nd; Thos Price, 3rd; James Lawson, honorable mention.

MODELLING CLASS.

James Kielly, special prize.

ATTENDANCE.

Free-hand Class—70 pupils; average attendance 24.
Architectural Class—47 pupils; average attendance 24.
Mechanical Class—35 pupils; average attendance 22.
Practical Geometry—53 pupils; average attendance 30.
Perspective Class—55 pupils; average attendance 10.

Books and Exchanges Received.

The Laws of Discursive Thought; being a Text-Book of Formal Logic, by James McCosh, LL. D., President of New Jersey College, Princetown; formerly Professor of Logic and Metaphysics, Queen's College, Belfast.—New-York: Robert Carter and Brothers.

Thirty-third Annual Report of the Board of Education, Massachusetts, for 1869.

The Bible in the Public Schools;—Opinions of Individuals and of the Press, with judicial decisions. This little brochure forms vol. V., of the Library of Education, published by J. W. Schermerhorn & Co., 14 Bond St., New York. We should be glad to have vols. 2, 3 and 4 of this series.

Works of Plautus with Notes Critical and Explanatory, by C. S. Harrington, M. A., Professor of Latin in the Wesleyan University.

Twenty-fifth Annual Report on Public Schools in Rhode Island, January, 1870.

History of the Public School Society of the City of New York with Portraits of the Presidents of the Society by Wm. Oland Bourne, A. M.
Hitchcock's New Monthly Magazine of Choice Music, Art Notes and Select Reading for the family circle, March and April, 1870. This

Magazine is now so widely known and appreciated that a word from us would be superfluous.

What has befallen the *Technologist* as we have only received the first number?

Whitney's Musical Guest, April, 1870.
Advertisers Gazette, (April, 1870) a Quarterly Magazine of information interesting to Advertisers and Publishers.—New York: S. P. Rowell & Co., 40 Park Row. Only 50 cents a year.

The Manufacturer and Builder, April, 1870.
Arkansas Journal of Education, April, 1870.
Kansas Educational Journal, The Organ of the State Teachers' Association, March, 1870.

The Rhode-Island Schoolmaster, April, 1870.
Ohio Educational Monthly, April, 1870.
The Minnesota Teacher, March, 1870.
The Illinois Teacher, Devoted to Education, Science and Free Schools, April, 1870.

American Educational Monthly, April, 1870. The best of its class.
Pennsylvania School Journal, April, 1870.
Appletons' Journal and Hearth and Home, to latest dates.

BLUE BOOKS.

Report of the state of the Militia of the Dominion of Canada for the year 1869.

Report of the Commissioners of the International Railway.

MISCELLANY.

Education.

—The Emperor of the French calls the Schoolmasters of France "the pacific army."—An interesting scene was witnessed yesterday, March 14th, at the Tuileries. During the Exhibition of 1867, as may be remembered, the primary schoolmasters who had come to Paris on the invitation of M. Duruy, then Minister of Public Instruction, received a most gracious reception from the Emperor when presented by his Excellency. In order to commemorate that event they decided on having a medal struck at their own expense, to be presented by their delegates to the Emperor, the Empress and the Prince Imperial. That ceremony has just now taken place, and M. Ségis, the present Minister of Public Instruction, invited to it his predecessor, M. Duruy, Senator; M. Charles Robert, Councillor of State, who has contributed so largely to the promotion of education among the people; the Prefect of the Seine, the Vice-Rector of the Academy of Paris, the inspectors of primary instruction and other persons interested in the question.

The Minister presented the delegates to the Emperor, announcing the object of this audience, when M. Velter, Director of the Communal School of the Faubourg St. Antoine, read the following

ADDRESS:—

SIRE—The constant solicitude of your Majesty for primary instruction had, for a long time past, called for a mark of gratitude on our part, and for which an occasion for manifesting itself was alone wanting. That opportunity was at length furnished during the Great Exhibition, on the day in which your Majesty, in this palace, gave so kindly a reception to the delegates of primary schoolmasters who had come from all parts of the Empire. On that day we resolved, by a unanimous and spontaneous movement, to perpetuate by a medal the recollection of your kindness and of the signal honor done to us. That token, Sire, we present to you to-day. It arrives, indeed, late; but a thought which consoles us is that this homage coincides with the return of a date very dear to our hearts and to yours.

His Majesty made the following

REPLY:—

I am aware of the devotedness with which the schoolmasters are animated in the interests of the country; I know how deserving they are of esteem. Tell them that I am pleased with their efforts, and that I desire to see them continue to give a patriotic, religious and intellectual instruction.

The Emperor then inquired from the Minister how many schoolmasters there are in the country, and on being informed that they amounted to about 45,000 in number added:—"It is an army—the pacific army of France."

His Majesty then sent for the young Prince, who was shortly afterwards followed by the Empress. Their Majesties and the Prince, after expressing their thanks to the schoolmasters, some of whom were much affected withdrew amid cries of "Vive l'Empereur! Vive l'Impératrice! Vive le Prince Imperial!"

The medal is of bronze, finely executed by M. Ponscarne under the direction of M. Cornu; it represents on one side the profiles of the Emperor, Empress and Prince, and on the other a portico with the word *Enseignement*, indicating the entrance to a new life, and encircled with the device, "1867, *Les Instituteurs de France reconnaissants*." Specimens were also presented to M. Ségis, M. Duruy, M. Charles Robert, and other persons.—From Gallignani's *Messenger*, March 15.

—*New Brunswick and the Gilchrist Scholarship*.—From a pamphlet recently published by the Canadian Government, containing Correspondence and Papers connected with the Gilchrist Scholarship Examinations, we learn that at the examinations for 1869, Mr. John Logan McKenzie, of Morrin College, Quebec, stood fifth, and Mr. Macfarlane of the University of N. B. stood sixth, in the Honour Division; and that each of these gentlemen obtained the number of marks qualifying for an Exhibition Scholarship or Prize, had the candidates been examined in England. To take such a high standing among a body of 500 candidates or upwards, drawn from the best schools in Great Britain, is very creditable to these young gentlemen. That they considerably outstripped the other candidates from the Dominion is apparent from the fact that the Canadian next on the Honour Division—a gentleman from Trinity College, Toronto—stands forty eighth. Mr. Macfarlane, however, is not the only Alumnus of the New Brunswick University who in 1869, distinguished himself in competition with outsiders; for we find that Mr. Russell, another graduate of the same University, was the successful competitor for the Ross Scholarship of the annual value of \$100, given in the Divinity Hall of Queen's College, Kingston. On the only two occasions on which the Gilchrist Scholarship has been opened in the Dominion, the competitors from our Provincial University have stood next to the winner. At the Examinations for the present year, we trust that the University will continue the contest which has been so creditable to it, and that it will this time send up a candidate who will take the first place. For, as remarked by the President at the opening of the Collegiate School, "only let the Professors and Students have the means, and they will show that they have the mettle to command success."—*New-Brunswick Head-Quarters*.

Literature.

—The "Continental Gazette and American Courier," an American journal printed in Paris gives us some interesting statistics relative to the press of that city. According to the "Gazette" there are at present 31 daily political papers in the French capital, and another is shortly to be added to the number by the creation of an organ of M. Thiers. In point of opinion the 31 journals may be classed as follows: 1 official, 4 semi-official, 3 Rouherist, 4 Ollivierist, 2 Legitimist, 2 Ultramontane, 2 Parliamentarian, ("Journal des Debats" and "Journal de Paris,") 1 Orleanist, 3 moderate Republican, 5 Revolutionary, 6 neutral Opposition, ("Figaro, Gaulois and Paris Journal,") and 1 satirical, ("Charivari.") Twelve out of the 31 existed before the *coup d'état*, 7 were founded or transformed from non-political into political journals during the arbitrary period of the Second Empire, (1852 to 1868;) the remaining 12 have sprung into existence since the voting of the last press laws, which abolished the necessity for a previous authorization. The highest price charged for any Paris daily political paper is 25 centimes, which is the cost of the "Journal Officiel" and "Journal des Debats." The lowest price is 4 centimes. One of the papers costs 20 centimes, 3 cost 10 centimes, and 26 cost 15 centimes each. The largest circulations during the month of December have been those of the "Marseillaise," 70,000, and of the "National" (10-centime paper,) the smallest circulation that of the "Pays," which averages 2,000. Throughout the year 1869 the mean sale of Paris, political papers (not counting the "Officiel") has been 360,000 copies per-diem, which represents a daily flow of 18,000 francs into the treasury for stamp duty, and an annual flow of 6,498,000 francs, (£259,920.) deduction being made of four days in the year when the papers do not appear. In addition to the thirty one journals already alluded to, the daily press of Paris counts two police gazettes and three 5-centime literary papers, ("Petit Journal, Petite Presse," and "Petit Moniteur,") the combined circulation of which exceeds half a million; there is also the "Petit Officiel," the proprietor of which is bound by his contract with government to distribute 53,000 copies a day gratis among the country populations. The weekly press of Paris boasts three financial prints, four illustrated journals after the pattern of the "Illustrated London News," and nineteen comic papers, besides which, medical, artistic, theatrical, and scientific journals without number. Strangely enough, however, there is not a single weekly political review like the London "Spectator" or "Saturday review." The last paper of that sort

that obtained any success was the famous "Courier du Dimanche," which was suppressed in 1866 by M. de Lavalette, in punishment for a brilliant—unfortunately too brilliant—article of M. Prevost Paradol.

The Book Trade of 1869.—The following is taken from an article in the *American Publisher and Bookseller*: The total number of publications in the United States during 1869 was 2406; of which 2,200 were bound books. The classification of these books is under the same head as last year, but their relative number have somewhat changed, so that their order becomes different under the rule of considering the most numerous class first.

Classes.	1869.
Fiction,	982
Religion	259
Poetry and Drama.	144
Directories, Almanacs, &c.	132
Law,	108
Biography and Genealogy,	95
Education,	95
Medicine and Surgery,	89
Miscellaneous,	83
History	82
Sociology,	72
Arts, Trades, &c.	65
Travels and Geography.	59
Fine Arts	41
Natural Science.	39
Government and Politics.	23
Learned Literature	13
Mental and Moral Philosophy.	12
Military and Naval	9
Periodicals	0
Mathematics (not school books)	0

2406

"The number of books printed abroad, imported in editions with American imprints, and placed in the American market with a title page worded as if they had been manufactured in this country, is 105. Many of these were books of importance. It is better to have a good book made in Great Britain rather than not to have the book. But other things being equal, and for the sake of our own compositors, employing printers, paper-makers, book-binders and publishers, and for the sake of those who depend on them, it is to be desired that the books used in the United States should be manufactured in the United States.

"The question of International Copyright has remained during 1869 in its inequitable and discreditable *statu quo*; and in the meanwhile the want of a proper law on the subject has permitted a disadvantageous series of rivalries to take place, by the simultaneous issue of duplicate or even triplicate editions of unprotected foreign works, to a considerable extent, and after a manner which may, for the time, result in furnishing cheap books, but which is not consistent with the best and pleasanter professional feeling among the trade, nor, in fact, in the long run, with the best and most profitable business methods. It is much to be wished that a proper law might be enacted. This will, however, assuredly not take place until some one shall preach the thing through Congress. Some resolute and able man must carry the point. One such could do it. Without him, it is not likely that it will be done."

Science.

—*The Tools of Great Workmen.*—Under this title the *American Artisan* says:

"It is not tools that make the workman, but the *trained skill and perseverance* of the man himself. Indeed, it is proverbial that bad workmen never yet had good tools. A student once asked a great artist by what wonderful process he mixed his colors. 'I mix them with my *brains*, sir, was his reply. It is the same with every workman who would excel. Ferguson made a wonderful thing—his wooden clock, that accurately measured the hours—by means of a common penknife, a tool in everybody's hand; but then everybody is not a Ferguson. A pan of water and two thermometers were the tools by which Dr. Black discovered latent heat. A prism, a lens, and a sheet of pasteboard enabled Newton to unfold the composition of light and the origin of color. An eminent foreign *savant* once called upon Dr. Wollaston, and requested to be shown over the laboratories in which science had been enriched by so many important discoveries. The doctor took him into a little studio, and, pointing

to an old tea-tray on the table, containing a few watch glasses, test papers, a small balance, and a blow-pipe, said: 'There is all the laboratory I have.' Stothard learned the art of combining colors by closely studying, butterflies' wings. He would often say, that no one knew how much he owed to those tiny insects. A burnt stick and a barn door served Wilkie in lieu of pencil and canvas. Bewick first practised drawing on the cottage walls of his native village, which he covered with his sketches in chalk; and Benjamin West made his first brushes out of a cat's tail. Ferguson laid himself down in the fields at night, in a blanket, and made a map of the heavenly bodies by means of a thread with small beads on it stretched between his eyes and the stars. Franklin first robbed the thunder-cloud of its lightning by means of a kite made with two cross sticks and a silk handkerchief. Watt made his first model of the condensing steam engine out of an anatomist's old syringe, used to inject the arteries previous to dissection. Clifford worked his problem in mathematics when he was a cobbler's apprentice, upon small scraps of leather, which he beat smooth for the purpose; while Rittenhouse, the astronomer, first calculated the eclipses on his plough-handles."

—*To Measure Heights.*—Mr. Stanley, of Holborn, is now making a very compact and useful instrument, called the Apomecometer, that can be carried in the waistcoat pocket, for ascertaining the vertical heights of towers, spires, and other buildings. It cannot be better explained, says the *Builder*, than by quoting the description given by Mr. Millar, the inventor. "The Apomecometer is constructed in accordance with the principles which govern the sextant, viz., as the angles of incidence and reflection are always equal, the rays of an object being thrown on the plane of one mirror are from that reflected to the plane of another mirror, thereby making both extremes of the vertical height coincide exactly at the same point on the horizon glass; so that, by measuring the base line, we obtain a result equal to the altitude." The instrument we have tried, testing several heights up to 50 ft., worked very accurately. We consider it to be a valuable acquisition for the architect, traveller, and sketcher. A small hinged handle might be added with advantage.

—*Tobacco.*—Dr. Willard Parker, the distinguished Christian physiologist of New York, in a letter written last year, speaks plainly and strongly concerning tobacco.

That tobacco is a poison is proved beyond a question. It is now many years since my attention was called to the *insidious* but positively destructive effects of tobacco on the human system. I have seen a great deal of its influence upon those who use it, and work on it. Cigar-makers, snuff-manufacturers, etc., have come under my care in hospitals and in private practice; and such persons *never* recover soon, and in a healthy manner, from any case of *injury* or fever. They are more apt to die in epidemics, and more prone to apoplexy and paralysis. The same is true, also, of all who *chew* or *smoke much*.

This poison enfeebles the mind. The Emperor Napoleon had his attention called to this subject in 1862 by a scientific statistician. A commission was appointed to inquire into the influence of tobacco in the schools and colleges. After a full and careful investigation, this commission reported that it had divided the people into two classes—the *users* and *non-users* of tobacco, and then proceeded to compare them, physically, intellectually, and morally. The result was that those who do not use tobacco were stronger, better scholars, and had a higher moral record. In consequence of this report an edict was issued prohibiting the use of tobacco in these national institutions, by which thirty thousand people were at once forced to abandon it.

—*On Fever.*—As long as the patient is able he should sit up out of bed, at least one hour of the day—longer, if he can bear it, and shorter time if he cannot bear it so long; but he should not be raised while he is perspiring. The bed should be made every day, the sheets and linen should be changed every two days, taking, however, the greatest care that they are dry even as tinder. Nothing more induces to protract a fever than keeping the sick constantly in bed, and withholding a constant and regular supply of fresh linen, though an unfortunate prejudice has established a contrary notion, to the loss of many thousand lives that might otherwise have been saved. A strict attention to these simple rules has radically cured many acute diseases, without the interference of other medical assistance; and nothing is more certain than that it will alleviate them all, and render other means, where they can be procured, more effectual. Diseases are not to be expelled at once by rough and precipitate usage; they must in a measure be allowed to run their regular course; and violent means cut short this course only by killing the patient.—*By a Physician.*

Art.

—*Bust of Lord Palmerston for Harrow.*—A massive pedestal of Cornish serpentine has just been placed in the library at Harrow; and on it will be placed a bust of the late Lord Palmerston. The stone is from the quarries of Lord Falmouth, near the Lizard. It is of a dark ground, with bright red figure, and contrasts with the white statuary marble of the bust. On the front of the pedestal is the word "Palmerston" in large gilt letters, and on the opposite side, "Presented by W. Grant, 1869." The pedestal was manufactured by Mr. John Murphy, on the Penzance Serpentine Works.

—*A Poet's Monument at Leek.*—A memorial cross will shortly be erected in Horton churchyard to the memory of George Heat, poet, by the subscriptions of his friends. It has been designed by his friend, H. Wilson Foster, of Kensington, and is in course of execution by Mr. Barlow, sculptor. It is a shaft, 9 ft. 8 in. high, on a plinth of one block, surmounted by an ornate cross, 3 ft. wide and 16 in. thick, in the centre of which is the sacred monogram, surrounded by a wreath of bay-leaves in relief. Up the shaft runs a sunken panel, containing the inscription, in old English, with red capitals. The front of the column and the three wings of cross are ornamented with carved arabesques in relief. It will be executed in the hardest Kerridge stone, polished. The inscription is as follows, the lines being a quotation from one of the deceased's poems:—
"Erected in memory of Geo. Heath, of Gratton, who, with few aids, developed in these Moorlands' poetic powers of great promise, but who, stricken by consumption, after five years' suffering, fell a victim to that disease May 5th, 1869, aged 25 years.

"His Life is a fragment, a broken clue—
His harp had a musical string or two;
The tension was great, and it sprang and flew,
And a few brief strains—a scattered few—
Are all that remain to mortal view,
Of the marvellous song the young man knew."

—*Memorial to the Marquis of Hastings.*—The "Hastings Memorial," which is to be erected over the grave of the late Marquis of Hastings, at Kensal-green Cemetery, is now completed, and will be shortly removed from the studio of Mr. Gaffin, the sculptor. It is very handsomely designed and carried out, the principal feature being a figure of Hope clinging to a cross. The figure is above life-size, and was carved from one solid block of white Carara marble, weighing over eight tons. The inscription in front of the memorial is as follows: Sacred to the beloved memory of Henry Weysford Charles Plantagenet Rawdon Hastings, Marquis of Hastings, who died Nov. 10th, 1868, aged 26. Lord, all-pitying Jesu blest, grant him Thy eternal rest."

—*John Hunter.*—The foundations of Kensington new church are laid, and we are glad to hear of a movement the object of which is to perpetuate the memory of at least one Kensington worthy by erecting a memorial window in his honour in the church. We allude to Hunter, who not only purchased land and built a house in the parish, but there prosecuted the researches which have immortalized his name. The *Athenaeum* calls on the College of Surgeons and the medical profession generally to aid in this object of doing honour to Hunter.

A beautiful stained glass window has just been placed in the Poets' Corner of the Abbey, to the memory of Chaucer. At the bottom of the window the Canterbury Pilgrims are represented setting out and arriving in London, and above, the poet is represented a commission to the Doge of Venice from Edward III.

—The estimates for the Science and Art Department show a proposed increase of £29,565 on the vote of last year, the sum now required being £239,290. £10,300 of this increase is appropriated to grants in aid to schools of science and art, and £15,750 in payments to managers of schools under the "Minute of 1865." The number of persons under instruction in science last May was 10,250, an increase of 3,388 over the number instructed in the preceding May. 104,668 persons were under instruction in drawing in the art schools, night classes, and schools of the poor. £10,000 is proposed to be voted for the removal of the iron building at South Kensington to Bethnal Green. The National Portrait Exhibition required £3,000; a like sum is estimated as received for admission; in 1866 the expenditure was £3,882; the accounts for last year are not yet closed. The vote proposed for building at South Kensington is £32,500, in addition to former sums, on account of a total of £195,000. The number of visitors to the South Kensington Museum has been much reduced during the past year, while the Geological Museum, Jermyn street, received more than double of either of the previous three years. The Edinburgh Museum also shows a considerable increase in the number of its visitors.

—*A Relic.*—There is in Lewes Castle a small organ which once belonged to Queen Elizabeth, but which is now the property of the South Saxon Lodge of Freemasons in that town. It was for many years preserved in a recess in the old castle, being presented to the Lodge by the

Duke of Sussex. It has now been repaired by Mr. Starnes; organist to the Lodge.

—The recent election to the vacant Associate-ship of the Royal Academy was decided in favor of Mr. Vicat Cole. It was generally understood that a standing reproach to the Academic body would be done away with by the election of a landscape painter, but it was thought that Mr. Peter Graham would have been the favorite. Mr. Cole eventually triumphed by a majority, we believe, of 11, the numbers being 29 to 18.

—A sum of £1,400 has been subscribed, chiefly among men of science, towards the memorial to the late Professor Faraday. It is expected that it will take the shape of a statue or monument in the British Museum.

Discoveries and Inventions.

—*Archæological Discovery in Athens. The Ancient Stadium.*—Galignani's Messenger has the following interesting particulars of recent excavations in Greece:

King George, of Greece, has conceived the happy idea of excavating the ancient Panathenaic Stadium, at Athens. To accomplish this design he has purchased, at his own expense, all the land supposed to have been occupied by the Greek and Roman race course, including the hills on the right bank of the Illissus, between which the long grass-grown hollow formed the theatre for the athletic performances. Workmen have now been engaged for several weeks in removing the immense masses of earth which generations have deposited over the ancient site. A German engineer is superintending the work, and the King visits the ground almost daily to watch the progress of the excavation, which is exciting much interest.

At a depth of several feet a perfect semicircular wall of compact marble has been exposed, and a corresponding interior wall of perfect masonry. Between these walls the spectators passed, ascending thence through marble entrances—two of which have also been discovered—to the seats in the amphitheatre above. These walls are supposed to have extended around the entire length of the race ground, and may be still existing. The upper end is in perfect preservation. Parts of columns have been exposed with carved work at the bases, and other marble fragments forming portions of the doorways and seats. It is remarkable that the archæologists have neglected this interesting site. It seems not to have occurred to them that the floor of the Stadium was much below the present level. It will not now be surprising if King George's discoveries equal those made along the slopes of the Acropolis, and which are now only second to the Parthenon and the Tharum. The length of the ancient Stadium was six hundred yards, the semi-circular end was artificial, and the natural slope of the banks formed the amphitheatre, where some forty thousand spectators seated themselves on the turf. This was the Stadium of the time of Sophocles. Herodes Atticus constructed the marble steps and seats, and this is the work now brought to light. It is described by Pausanius as having been "of white marble and wonderful to behold." The King intends to upturn the earth over the whole extent of the plain and hill sides, so that whatever exists in the way of stone-work may be revealed.

—*A Curious Invention.*—The *Pall Mall Gazette* says: "An invention has been produced in Paris for settling disputes between cab-hirers and cab-drivers, which seems to deserve attention. According to the account of it, which we have received from a correspondent, the "compteur mécanique," or calculating machine not only reckons the distance traversed, but indicates as well the exact sum of money due to the driver. "Two dials are fixed on the back of the driving seat; one contains a clock, while on the other the distance travelled is indicated by a hand acted on by the wheels; it is entirely beyond the control either of cabby or his "fare." The apparatus is put in and out of gear by the lowering and raising of a lever bearing the word "liber," which is only visible when the cab is empty and the "compteur" consequently unemployed. There is no danger of the driver omitting to lower this lever as soon as he is hired, it being evidently his interest to have the greatest possible distance paid for; while, on the other hand, it would be useless for him to try to make a fictitious fare by driving about with his "compteur" in motion, for a card in the interior of the machine registers the distance traversed during the day, and the money to be accounted for to the cab owner. The great difficulty has hitherto been to find a means of marking the time spent in visits, shopping, blocks in the street, etc, when the wheels and the tell-tale are necessarily at a standstill. M. Bruet the inventor of the new register, has now overcome this difficulty by an ingenious contrivance, by means of which, as soon as the wheels cease to act on the indicator, the clock which forms part of the machine keeps the tell-tale hand moving at a rate which credits the driver with eight kilometers (about five miles) an hour, or two francs, according to the Paris tariff."

Meteorology.

—From the Records of the Montreal Observatory, lat. 45° 31 North; Long. 4h. 54m. 11 sec. West of Greenwich, and 182 feet above mean sea level,—for March 1870,—By CHAS. SMALLWOOD, M.D., LL.D., D.C.L.

DAYS.	Barometer corrected at 32°			Temperature of the Air.			Direction of Wind.			Miles in 24 hours.
	7 a.m.	2 p.m.	9 p.m.	7 a.m.	2 p.m.	9 p.m.	7 a.m.	2 p.m.	9 p.m.	
1	29.549	29.532	29.561	24.2	27.2	25.2	wby s	w	w	97.24
2	.698	.750	.831	15.6	20.2	18.2	wby s	wby n	wby n	147.10
3	35.148	30.217	30.300	8.3	29.2	13.1	wby n	wby n	wby n	201.10
4	.248	.111	.100	10.9	19.8	18.1	wby n	w	w	89.24
5	.147	.164	.200	10.3	26.8	22.3	n e	n e	n e	77.20
6	.191	.177	.125	23.2	27.3	22.0	n e	n e	n e	58.17
7	29.948	29.921	29.900	17.1	29.0	23.2	n e	n e	n e	70.90
8	.949	.977	30.001	20.0	38.4	24.0	n e	n e	w	81.14
9	30.026	.975	29.967	20.0	39.0	24.2	n e	w	w	79.00
10	29.986	.961	.989	16.0	35.1	13.2	w	wby n	wby n	104.24
11	30.144	30.066	30.075	0.1	20.0	9.1	n	w	w	71.11
12	.067	.016	29.871	5.0	21.1	7.0	w	n e	n e	80.00
13	29.569	29.511	.751	9.8	22.8	19.2	n e	n e	n e	121.47
14	.891	30.073	30.061	14.0	43.1	29.0	n e	w s w	s w	111.29
15	30.172	.199	.100	17.4	46.2	30.1	n e	n e	n e	101.10
16	29.901	29.017	29.564	20.0	38.3	33.7	n e	n e	n e	97.29
17	.497	.571	.674	26.7	28.7	26.0	n e	n e	n e	204.21
18	.849	.924	30.049	24.7	41.1	29.1	n e	n e	n e	311.00
19	30.198	30.179	.111	17.0	40.2	30.0	w	w s w	w s w	61.14
20	.021	.000	29.850	27.4	42.4	32.1	w	w	w	81.19
21	29.688	29.690	.760	34.4	35.6	35.0	n e	n e	n e	66.00
22	.763	.774	.800	34.0	33.1	30.2	w	w	w	71.14
23	.920	.998	50.125	23.2	31.6	18.0	w	n e	n e	104.10
24	30.274	30.346	.375	15.9	37.1	20.2	w	w	w	94.18
25	.451	.492	.505	11.9	35.7	19.1	w n w	w	w	70.91
26	.501	.451	.349	17.9	36.7	30.7	n e	n e	n e	69.20
27	.176	.050	29.952	31.9	38.1	35.6	e	e	n e	87.00
28	29.660	29.694	.711	30.0	35.0	34.1	n e	n e	n e	319.94
29	.872	30.043	30.149	34.3	48.9	36.0	n e	n e	n e	244.20
30	30.184	.249	.249	33.0	51.7	34.3	n e	n e	n e	79.12
31	.351	.269	.269	30.1	52.2	43.1	n e	n e	n e	84.00

Remarks.—The highest reading of the Barometer occurred on the 26th day, and indicated 30.501 inches; the lowest was on the 1st day, and was 29.549, giving a monthly range of 0.952 inches. The highest reading of the Thermometer was on the 31st day, and was 52° 2; the lowest was on the 12th day, and was 5° 4 below zero. The monthly range was 57.62. The mean temperature of the month was 26° 89, which is a fraction of a degree lower than the *isotherm* for Montreal. Snow fell on eight days, amounting to 9.10 inches. Rain fell on one day, amounting to 0.074 inches

—Meteorological Observations taken at Quebec, during the month of March, 1870; Latitude 46° 48' 30" North; Longitude 71° 12' 15" West; Height above St. Lawrence 230 feet.

Barometer, highest reading on the 26th.....	30.352 inches.
“ lowest “ “ 1st.....	29.131
“ range of pressure.....	1.221
“ mean for month (reduced to 32°).....	29.699
Thermometer, highest reading on the 12th.....	47.2 degrees.
“ lowest “ “ 4th.....	-10.6
“ range in month.....	57.8
“ mean of highest.....	37.1
“ mean of lowest.....	16.1
“ mean daily range.....	21.0
“ mean for month.....	26.6
Hygrometer, mean of dry bulb.....	27.2
“ “ wet bulb.....	24.3
“ “ dew point.....	11.0
“ elastic force of vapour.....	.071 inches.
“ vapour in a cubic foot of air.....	0.9 grains.
“ “ required to saturate do.....	0.8
“ mean degree of humidity (Sat. 100).....	48
“ average weight of a cubic foot of air.....	566.3
Cloud, mean amount of, (0-10).....	5.1
Ozone, “ “ (0-10).....	4.5
Wind, mean direction of “ North.....	4.50 days.
“ “ “ East.....	10.75
“ “ “ South.....	5.25
“ “ “ West.....	9.00
“ “ “ calm.....	1.50
“ “ force by estimation.....	2.8
“ “ daily horizontal movement.....	175.3 miles.
Rain fell on.....	1 days.
Snow fell on.....	9 do.

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Montreal, March 16, 1870.

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OFFICIAL TABLES.

APPORTIONMENT OF THE SUPPLEMENTARY GRANT TO POOR SCHOOL MUNICIPALITIES FOR 1869.

COUNTIES.	MUNICIPALITIES.	Reasons for the Grant as well as the Amonnt.	Amount of Ordinary Grant.	Amount of Assessment Raised.	Amount Asked.	Amount Granted.
Argenteuil....	Gore and Wentworth.....	New and poor.....	128 42	240 00	170 00	25 00
"	Grenville No. 3.....	" ".....	44 80	150 00	40 00	20 00
"	" No. 2.....	" ".....	91 68	96 00	40 00	16 00
"	Township of Morin.....	" ".....	34 24	130 00	30 00	16 00
"	" (Diss.).....	" ".....	16 36	70 00	25 00	16 00
"	Arundel.....	" ".....	4 02	72 45	30 00	30 00
"	Mille Isles Nos. 1, 2, 3.....	" ".....	60 26	193 00	30 00	24 00
Arthabaska....	Chenier.....	New and maintains six schools.....	160 05	667 03	40 00	30 00
"	St. Valère.....	" " three ".....	55 28	146 00	30 00	30 00
"	St. Clothilde.....	" " two ".....	21 36	150 00	30 00	30 00
"	Blanford.....	" " three ".....	57 42	145 00	30 00	30 00
"	Chester, (East).....	" " four ".....	88 98	152 00	30 00	30 00
"	" (West).....	" " six ".....	84 90	420 00	30 00	30 00
"	Arthabaskaville.....	" " four ".....	87 63	305 00	30 00	30 00
"	Warwick.....	" " seven ".....	121 74	700 00	30 00	30 00
"	St. Norbert.....	" " six ".....	139 30	257 00	30 00	30 00
"	St. Christophe.....	" " six ".....	167 26	257 00	40 00	30 00
"	Tingwick.....	Population poor and scattered.....	121 54	334 00	30 00	25 00
"	Victoriaville.....	Maintains four schools.....	92 07	623 00	30 00	30 00
L'Assomption..	St. Albert.....	Population considerably increased since last census.....	20 58	164 00	30 00	30 00
Bagot.....	St. Lin, (Diss.).....	" Small and scattered.....	36 50	120 00	30 00	16 00
"	Acton Vale.....	Has lost this sum through the last Education Law.....	138 04	581 00	200 00	140 00
"	St. André.....	" \$25.50, poor.....	47 19	191 00	100 00	40 00
"	St. Théodore.....	" 30.00, ".....	111 58	350 00	40 00	40 00
"	St. Liboire.....	" 30.00, ".....	108 52	771 00	40 00	40 00
"	St. Ephrem.....	" 30.00, ".....	108 82	450 00	40 00	40 00
"	Ste. Hélène.....	" 25.00, ".....	102 42	350 00	40 00	40 00
Bonaventure...	Rustico.....	New and poor, two schools.....	43 06	165 34	50 00	30 00
"	Carleton.....	" " " ".....	108 30	240 00	50 00	25 00
"	New Richmond.....	" " " ".....	51 00	168 00	50 00	25 00
"	Port Daniel.....	" " three ".....	130 58	182 00	50 00	25 00
"	Maria.....	" " five " (one Model School).....	206 10	396 00	60 00	25 00
"	Hamilton.....	" " seven ".....	73 99	544 35	60 00	30 00
"	" (Diss.).....	Not numerous.....	90 80	54 15	80 00	16 00
"	Cox.....	Poor, two schools.....	35 00	238 00	50 00	35 00
"	" (Diss.).....	Not numerous.....	98 68	50 00	80 00	16 00
"	Hope.....	Poor, two schools.....	50 00	310 00	30 00	20 00
"	Ristigouche (Indian).....	Very poor.....	35 04	100 00	40 00	40 00
"	Matapédia.....	Not numerous and poor.....	59 97	125 00	30 00	25 00
"	Nouvelle.....	Poor, two schools, (one Model school).....	73 02	140 00	50 00	20 00
Bellechasse....	St. Cajetan d'Armagh.....	New and poor, four schools.....	235 48	200 00	100 00	30 00
"	St. Lazare.....	Poor, maintains seven schools.....	132 84	392 60	50 00	30 00
Beauharnais....	St. Stanislas.....	Poor, maintains four schools.....		389 00	40 00	30 00
"	" (Diss.).....	Poor and scattered.....		110 00	40 00	16 00
"	St. Louis Gouzague.....	Has lost this sum through the last Education Law.....				30 00
"	St. Clément.....	" " " ".....				16 00
"	St. Etienne.....	" " " ".....				16 00
Beauce.....	St. George.....	Maintains six schools.....	200 10	315 84	40 00	30 00
"	Forsyth.....	" two ".....	76 54	109 00	40 00	20 00
"	Aylmer.....	" three ".....	53 94	131 00	30 00	25 00
"	St. Ephrem.....	" five ".....	104 02	300 00	40 00	25 00
"	Lambton.....	" four ".....	143 32	425 00	40 00	25 00
"	St. Frederick.....	" six ".....	169 58	263 00	30 00	30 00
"	St. Côme.....	New and poor.....	62 52	165 00	30 00	20 00
Berthier.....	St. Gabriel de Brand., (Diss.).....	Few and scattered.....	15 56	21 26	30 00	16 00
"	Bolton, (Diss.).....	Poor and scattered.....	34 24	132 65	100 00	20 00
Brome.....	Eboulements.....	Maintains six schools, (one Model School).....	149 80	332 93	25 00	25 00
Charlevoix....	Callières.....	Poor and scattered.....	30 06	30 86	30 00	20 00
"	Hereford.....	Maintains seven schools, and has built three (\$900).....	41 38	500 00	50 00	30 00
Compton.....	St. Romain.....	New, maintains three schools.....	80 62	248 00	30 00	25 00
"	Winslow South.....	Four schools, population sparse.....				20 00
"	" (Diss.).....	Sparse.....	102 18	419 53	30 00	16 00
"	Whitton.....	New, maintains two schools.....	57 88	85 00	30 00	20 00
"	Clifton.....	" " five ".....	61 50	256 00	75 00	30 00
Amount carried over.....						1785 00

APPORTIONMENT OF THE SUPPLEMENTARY GRANT TO POOR SCHOOL MUNICIPALITIES FOR 1869.—Continued.

COUNTIES.	MUNICIPALITIES.	Reasons for the Grant as well as the Amount.	Amount of Ordinary Grant.	Amount of Assessment Raised.	Amount Asked.	Amount Granted.
		Amount carried over.....				5370 00
Rimouski.....	Métis.....	Poor, three schools.....	57 08	146 00	40 00	36 00
"	St. Mathieu.....	" and scattered, two schools.....	84 10	120 00	32 00	30 00
"	McNider.....	" five schools.....	139 62	240 00	30 00	30 00
"	Ste. Félicite.....	" three ".....	128 44	136 00	40 00	30 00
"	St. Ulric.....	New and poor, two schools.....	62 06	156 00	50 00	30 00
"	St. Octave.....	Has lost \$28 by the effect of the last Educat. Law.....				28 00
Richmond.....	Stoke.....	New and poor, five schools.....	70 40	792 26	50 00	30 00
"	Shipton, (<i>Diss.</i>).....	Poor and scattered, two schools.....	24 92	50 27	30 00	40 00
"	St. George.....	Poor and sparse, five schools.....	70 10	403 00	40 00	30 00
"	Brompton, (<i>Diss.</i>).....	Few in number, one school.....	20 84	50 00	30 00	20 00
Sagueuay.....	Ste. Marguerite.....	Very poor, one school.....	22 60	22 60	20 00	20 00
"	Rivière au Canard.....	" " ".....			20 00	20 00
"	Tadoussac.....	Poor and scattered, one school.....	51 78	30 00	30 00	20 00
"	Escoumins.....	" " ".....	116 34	76 00	30 00	20 00
"	Bergeronnes.....	" " ".....	40 00	31 00	30 00	20 00
Shefford.....	St. Valérien.....	Maintains five schools.....	107 40	322 00	40 00	30 00
"	Roxton.....	Has lost this sum through the last Education Law.....				256 00
"	Ely (South).....	Poor, three schools.....	120 64	730 67	40 00	25 00
"	Ely (North).....	" eight ".....	76 98	651 68	40 00	35 00
"	Stukeley (North).....	Has lost this sum through the last Education Law.....				29 00
"	Granby, (<i>Diss.</i>).....	Poor and scattered, six schools.....	126 92	188 00	40 00	30 00
"	Granby Village, (<i>Diss.</i>).....	Sparse and poor, one school.....	23 62	36 00	30 00	30 00
"	Ste. Cécile.....	Has lost this sum through the last Education Law.....				16 00
St. Maurice.....	Shawenigan.....	New and poor, three schools.....	114 18	324 45	50 00	25 00
"	St. Sévère.....	Poor, four schools, (one Model School).....	105 82	166 32	40 00	30 00
Stanstead.....	Coaticook.....	Sparse and poor, one school.....	28 10	111 32	40 00	30 00
"	Barford.....	" six schools.....	41 70	59 00	40 00	35 00
"	Hatley, (<i>Diss.</i>).....	" poor, two schools.....	79 14	300 00	30 00	30 00
St. Jean.....	Lacolle.....	Has lost this sum through the last Education Law.....	231 88	705 00	72 00	72 00
Terrebonne.....	Ste. Agathe.....	New and very poor, two schools.....	90 44	42 40	60 00	30 00
"	Abercrombie.....	" " " one school.....	55 96	48 84	30 00	20 00
"	Ste. Sophie.....	" " " four schools.....	190 34	247 00	40 00	40 00
"	St. Jérôme, (<i>Diss.</i>).....	Sparse, one school.....	34 74	71 00	30 00	16 00
"	Ste. Marguerite.....	New and very poor, two schools.....	79 72	60 00	40 00	30 00
"	Ste. Adèle.....	Poor, two schools.....	140 98	240 00	30 00	30 00
Témiscouata.....	St. Eloi.....	" five ".....	157 92	221 00	40 00	30 00
"	St. Antonin.....	" four ".....	125 24	111 22	30 00	30 00
"	St. Jean de Dieu.....	New and poor, one school.....	23 30	40 00	30 00	25 00
"	St. Modeste.....	" " two schools.....	70 10	120 00	40 00	20 00
"	St. Epiphane.....	" " three ".....	125 04	120 00	30 00	20 00
Wolfe.....	Ham (South).....	" " two ".....	25 22	120 00	30 00	30 00
"	Ham (North).....	" " four ".....	68 96	180 00	40 00	30 00
"	Weedon.....	" " five ".....	79 02	817 44	40 00	30 00
"	Weedon, (<i>Diss.</i>).....	Few in number and scattered, one school.....	12 44	39 00	50 00	20 00
"	Wolfestown.....	Maintains four schools.....	140 18	300 00	40 00	30 00
"	Wotton.....	" nine ".....	91 46	500 00	50 00	30 00
"	St. Camille.....	" four ".....	54 94	250 00	40 00	30 00
"	St. Gabriel.....	New and poor, one school.....	46 70	80 00	30 00	30 00
"	Garthby.....	" " ".....	31 68	41 00	30 00	30 00
Yamaska.....	St. Zéphirin.....	Maintains six schools.....	148 72	440 00	40 00	30 00
		Total.....				\$7028 00