

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for scanning. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of scanning are checked below.

L'Institut a numérisé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de numérisation sont indiqués ci-dessous.

- | | | | |
|-------------------------------------|---|-------------------------------------|---|
| <input type="checkbox"/> | Coloured covers /
Couverture de couleur | <input type="checkbox"/> | Coloured pages / Pages de couleur |
| <input type="checkbox"/> | Covers damaged /
Couverture endommagée | <input type="checkbox"/> | Pages damaged / Pages endommagées |
| <input type="checkbox"/> | Covers restored and/or laminated /
Couverture restaurée et/ou pelliculée | <input type="checkbox"/> | Pages restored and/or laminated /
Pages restaurées et/ou pelliculées |
| <input type="checkbox"/> | Cover title missing /
Le titre de couverture manque | <input checked="" type="checkbox"/> | Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées |
| <input type="checkbox"/> | Coloured maps /
Cartes géographiques en couleur | <input type="checkbox"/> | Pages detached / Pages détachées |
| <input type="checkbox"/> | Coloured ink (i.e. other than blue or black) /
Encre de couleur (i.e. autre que bleue ou noire) | <input checked="" type="checkbox"/> | Showthrough / Transparence |
| <input type="checkbox"/> | Coloured plates and/or illustrations /
Planches et/ou illustrations en couleur | <input checked="" type="checkbox"/> | Quality of print varies /
Qualité inégale de l'impression |
| <input checked="" type="checkbox"/> | Bound with other material /
Relié avec d'autres documents | <input type="checkbox"/> | Includes supplementary materials /
Comprend du matériel supplémentaire |
| <input type="checkbox"/> | Only edition available /
Seule édition disponible | <input type="checkbox"/> | Blank leaves added during restorations may
appear within the text. Whenever possible, these
have been omitted from scanning / Il se peut que
certaines pages blanches ajoutées lors d'une
restauration apparaissent dans le texte, mais,
lorsque cela était possible, ces pages n'ont pas
été numérisées. |
| <input checked="" type="checkbox"/> | Tight binding may cause shadows or distortion
along interior margin / La reliure serrée peut
causer de l'ombre ou de la distorsion le long de la
marge intérieure. | | |
| <input checked="" type="checkbox"/> | Additional comments /
Commentaires supplémentaires: | | Continuous pagination. |

If not called for within one month, the Postmaster will please send to the School Inspector.

JOURNAL OF

Province of



EDUCATION,

Ontario.

VOL. XXVII.

TORONTO, AUGUST, 1874.

No. 8.

CONTENTS OF THIS NUMBER.

	PAGE.
CONVENTION OF INSTRUCTORS FOR THE DEAF AND DUMB	113
I. PAPERS ON PRACTICAL EDUCATION.—(1) The Teacher. (2) Astronomical Geography	120
II. EDUCATION IN VARIOUS COUNTRIES.—(1) Vote for English Education. (2) Irregular School Attendance	120
III. PAPERS ON LITERATURE AND SCIENCE.—(1) On Spare Hours and Reading. (2) Preparation in Vacation. (3) The Comet. (4) Safety of Lightning Rods. (5) Population of the Globe. (6) What makes the Sky blue	121
IV. MONTHLY REPORT ON METEOROLOGY OF THE PROVINCE OF ONTARIO	124
V. MATHEMATICAL DEPARTMENT.—Solutions of Normal School Examination Questions on Algebra and Natural Philosophy	125
VI. EDUCATIONAL INTELLIGENCE.—(1) Ottawa Collegiate Institute	126
VIII. DEPARTMENTAL NOTICES	128
IX. ADVERTISEMENTS	128

CONVENTION OF INSTRUCTORS OF THE DEAF AND DUMB.

Under the authority of the Ontario Government, an invitation was extended to the Instructors of Deaf and Dumb on this continent, to hold their 8th annual convention at the Belleville Institution, on the 15th, 16th, and 17th, instant. Accordingly Delegates from the State of Alabama, Arkansas, California, District of Columbia, Connecticut, Iowa, Illinois, Indiana, Maryland, Massachusetts, Missouri, Mississippi, Minnesota, Nebraska, New York, North Carolina, Ohio, Virginia, and Wisconsin, with Delegates from Nova Scotia and Ontario, met at Belleville on the 15th inst. About 200 persons were present. Dr. Landon, of the Asylum at London, Ontario, was named temporary Chairman, and Mr. Coleman, of the Belleville Institution, temporary Secretary. Finally the following list of officers were appointed:—President—Rev. W. Turner, Ph. D., Connecticut; for Vice-Presidents—Rev. Thomas McIntyre, M.A., Indiana; Isaac T. Peet, LL.D., New York; Edward M. Gallaudet, Ph.D., LL.D., Washington; Philip G. Gillett, LL.D., Illinois; Wm. D. Kerr, M.A., Missouri; J. Scott Hutton, M.A., Nova Scotia; Joseph H. Johnson, M.D., Alabama. For Secretaries, Edward A. Fay, Washington; John Nichols, North Carolina; J. B. McGann, Ontario.

The President, on taking the chair said, that he had thought when coming here, that a service of forty-two and a half years in the Institution of the Deaf and Dumb, might have excused him from taking an active part in the proceedings of this Con-

vention. He could not, however, refuse to do anything he could in the good work, and therefore he accepted the position. In the course of a few further remarks, he claimed for the Instructors of the Deaf and Dumb in America, that they had done their duty well, and that their work was noble and honourable, and exhorted them to go on in it. The President himself has been fifty-three years engaged in the work of teaching deaf mutes.

The proceedings of the Convention were formally opened with prayer by Rev. Mr. Burke.

Dr. Peet (New York) proceeded to read a paper on language lesson, on the principle of object teaching which he explained, was a summary of a book he was about to publish. The method of instruction contained in this book was stated to consist, to a considerable extent, in giving the pupil a direction in writing, and then requiring him to perform it, and to state in writing what he did. In employing this system the teacher must have before him twelve objects, whose names are arranged with a view to embracing the whole alphabet, so that when the pupil has learned to write them he has also learned to write all the letters in use, the distinction to be observed between the definite and the indefinite article, the proper use of prepositions, the words and characters representing numerals up to one hundred, adjectives of colour, and a considerable number of verbs. The sentence forms were confined to the illustration of the government of the objective case. Time was exemplified by the present, imperative and the past indicative. The following, among other advantages, were claimed to be derived by the pupil from the use of this system:—He learns to read and write at the same time. He is made to comprehend perfectly what he reads and writes, and in that way early forms the habit of composition. He unconsciously acquires at the outset, and for all time, by a system which teaches by practice, without rules, the most important rules of grammar. The teacher was led to see the importance of bringing his pupil in all instruction into more direct relations with the subject taught. The foreigner, with this system, can be taught the English language. By it the pupil is taught to associate names of objects directly with the objects themselves. He can make no advances so long as the ground he has gone over is only partially tilled. The system does not depend for its results on the tact, ingenuity and skill of the teacher, and thus parents have a means of starting their children on the road to language before sending them to an institution especially designed for their benefit. The education of the deaf-mute can be commenced at an earlier age than has heretofore been considered advisable, because repetition rather than reasoning is involved.

Mr. Schelling (Wisconsin) read a paper entitled "In the School-room." He dwelt on the importance of sign language being exclusively employed in the school-room, except in cases in which it is only possible in some other way to make plain to the mind of the pupil something which it is desired to convey to him. One of the first things the teacher should aim at was to enable his pupil to ask questions and to understand what was asked for. The teacher of deaf-mutes should never aim at giving his pupils a great multitude of words, or at displaying their skill in writing long and complicated sentences, or parade a great tact in the grammatical analysis of such sentences, or make pupils write sentences involving difficult idioms or grammatical constructions. The teacher should from first to last aim to make language expressive of correct ideas which are within

the grasp of the child or with which he is perfectly familiar, and these ideas should be clothed in the simple and clear language of the child, that is, in very short and distinct sentences. The teacher should stop to teach the entire alphabet before he began to teach the sentences. It was now generally known that a child learned the alphabet sooner by seeing the letters in words than by seeing them separately. It should be remembered also that thinking is done in sentences and not in words. The essay contained a great many hints of great value to teachers of deaf and dumb, but not of very general interest.

At this stage the Board of Education of the town was introduced, and on their behalf, Prof. Bell, of Albert College, read an address of welcome to the Convention.

The President in reply said: We are greatly obliged to the Committee on Education of this city, for their kind welcome of us to this place, and desire to assure them that we have been greatly gratified at finding so beautiful a place as this, and particularly so eligible a location and such convenient and elegant buildings as we find here prepared for this unfortunate class of our fellow-beings—the deaf and dumb. We find here an institution which, considering the time it has been in operation, is far in advance of those which were established in the United States some fifty years ago or a little more, and we are gratified to find in it a school of over 200 children who have been gathered together within four years, and so competent a Principal and Board of Instructors, some of whom we have known for many years, and in whom we have the fullest confidence. We are all labouring in the same benevolent field of literary and Christian work. You are gathering your sheaves in the broad field covered with the ripe grain, having the full harvest; we are gathering up the scattered sheaves that lie around neglected in this large country—here one, there another. We find this class of persons generally gathered into well ordered and well regulated institutions, receiving the blessings of a common school education, and I may also say, a collegiate education. But what is better than all, these unfortunate children have been taught that they have a soul within them destined to immortality, that there is a God in Heaven above them, whose providential care is over all, and to whom all are responsible, and to whose blessed abode the good are expecting to go. They knew nothing of all these great themes, of these inspiring hopes, of these glorious realities, but now, by the instrumentality of this institution, and other similar institutions in this broad country, they do to a very great extent. I wish I could say they were all gathered in, but to a very great extent they are, and these blessings of education and these blessings of religion are shed upon them, and the light of truth shines into their minds, and they are inspired by the same hopes of a glorious immortality that we are; and if we are of the faithful in our respective fields we may expect to gather a harvest not only here but a more glorious harvest in the better land, where the ears of the deaf shall be opened, where the lips of the dumb shall sing, and speak forth the high praises of our common God. You will accept, therefore, our thanks for your kind greetings and especially for the invitation to assemble here in Convention at your beautiful place and in your beautiful institution. (Applause.)

A discussion on the paper read in the morning by Dr. Peet, then took place.

Mr. Greenberger (New York) did not see how Dr. Peet's methods of object teaching would be practicable in every case. If for instance, he wrote down the word "cow" and wished to explain to the pupils what he meant, would he bring a cow into the school-room? (Laughter.) With reference to some of the illustrations of his method which Dr. Peet gave, the speaker remarked that in the sentence "John touched the saw," the collocation of the word did not correspond with the sequence of the idea in the pupil's mind. The ideas would follow each other in the pupil's mind in this order, "John the saw touched."

Dr. Peet said that his system did not preclude the use of pictures when it was impracticable to have the objects themselves in the school-room. With reference to the other observation of Mr. Greenberger he said that the pupil was supposed to have learned the names of the several objects before an attempt to teach him the verb was made, and to do the latter was all that then remained to be done.

Mr. Hutton (Nova Scotia) remarked that Dr. Peet's system as explained by him in his paper was a novel one, but it had stood the test of experience. In teaching a pupil language he (Mr. Hutton) would begin by giving him a complete sentence on simple subjects, repeating it daily, and would contemporaneously teach him other subjects. He would seek to get rid of the mere trammels of grammar and allow the pupil to use his words in an order corresponding with the collocation of his ideas.

Prof. Cook (New York) thought the system of Dr. Peet a good one, but he regretted that it did not begin with complete sentences

and not with mere vocabularies. He thought that when anything struck a teacher as a good idea in teaching it should be tried in one class in one institution and then adopted in all the classes, or rejected, according as it was found to have good results or not. He considered it desirable that they should experiment with every single thing in the way of teaching. The majority of congenital mutes who now received instruction in their institutions could read and understand an account of a railway accident for instance; but if they read a report of a speech they could not understand it. He concluded by moving a resolution in favour of each institution trying with one class any new method of instruction which might suggest itself as feasible, and reporting fully on it at the next meeting.

Mr. Wilkinson (California) said that his experience had taught him that it made little difference whether the instruction of a deaf-mute commenced with words or with sentences. He thought that by the use of objects and writing he could, in the course of an hour, teach a Chinaman several things in our language, although previously the man had not known a word of it. For instance, he would write down the sentence, "John touched the box," and not only would he soon be able to show the man what "John" and "box" meant, but he would after a few trials, get him to understand that that particular form which we called "touched" represented a particular action. No one who professed to have much intelligence now thought it necessary to teach any child the alphabet, but taught him to read by means of words. He expressed himself as having great confidence in the sign language, and denied that their young women and young men could not read and understand the newspapers. In proof of this he mentioned a number of deaf-mutes whom he had instructed. The trouble with a deaf-mute was that he did not come into contact with words often enough.

Mr. McGann also held that being able to think in a language was of the highest importance. He thought the sign language should be but sparingly used, and that deaf-mutes should be principally taught by objects.

One of the large class-rooms of the Institution, Dr. May, of the Education Department of Ontario, has, in the space of a few hours, transformed into an extensive museum. The articles therein are from the museum of the Educational Department, Toronto, and embrace a great variety of philosophical apparatus, birds, models for instruction in anatomy, stuffed birds, etc. Mayor P. S. Tucker, President of the Board of Trustees of the Deaf and Dumb Institute of North Carolina, to-day gave an order for a full set of anatomical models similar to those on exhibition, which he intends to present to the Institute in his State.

In the evening a social entertainment in honour of the members of the Convention was given in the Town Hall, by the Mayor and Corporation of Belleville and County Council. Mayor Henderson took the chair, and, after a few words of welcome, called on the Hon. Billa Flint to address the assemblage. In the course of his remarks, Mr. Flint stated that the institution at this town was opened in October, 1870, and although it had thus only been open now three months less than four years, it stood seventh among the whole forty-five in America with regard to the number of pupils. He paid a high tribute to the abilities of Dr. Palmer, the Principal of the Ontario Institute, and concluded a neat address by extending to the delegates a hearty welcome to "the City of the Bay," and to the homes and hearts of its people.

The President of the Convention responded in happy terms, giving, in the course of his reply, some interesting reminiscences of a holiday visit which he paid to Canada about 35 years ago, just after the Rebellion.

A number of sentiments, which would have been called toasts if there had been wine to drink them in, were then proposed and responded to. They comprised the usual loyal and patriotic toasts, the President of the United States, the Legislatures of Canada and Ontario, the Educational Institutions of the United States and Canada, the Ladies of the Benevolent Institutions of Canada, the Warden and Council of Hastings, the Mayor and Council of Belleville, and one or two others. The several sentiments were accompanied by suitable airs performed by an orchestra, or by songs. Among other remarks,

Dr. Hodgins, Deputy Superintendent of Education for the Province of Ontario, on being called upon, said:—

Mr. Mayor and Mr. Warden—Ladies and Gentlemen,—At this late hour of the night (11 o'clock), I should not have ventured to occupy the attention of this large assemblage, were it not that I was most anxious to convey to the distinguished American Delegates to this Convention, the heartfelt greetings of the Education Department of the Province of Ontario, with which I have the honour to be connected. And I can truly say that the sentiments of cordiality and welcome, embodied in the beautiful address presented to the Convention this day by the Board of Education in this town, are also the sentiments and feelings to our American

educationist friends of the nearly 5,000 school corporations in this Province. On behalf, therefore, of this large constituency, representing the High and Public Schools of the Province, I tender their greetings of welcome to the members of this Convention. (Applause.)

As time is pressing, I shall only mention a few facts relating to our educational progress, which may be of interest to the American Delegates present. I speak of the facts only of which I am personally cognizant, and which have transpired during my own experience in the Education Department of the Province. In 1844, the expenditure on behalf of education in Upper Canada (now Ontario), not including the colleges and universities, was between \$300,000 and \$400,000. It now reaches the sum of upwards of \$2,500,000, exclusive of the sums expended in colleges and universities! The number of schools, too, has increased from 2,600 to nearly 4,750.

Then as to the organization of the school system itself. The law has been thoroughly discussed of late, and has been recently amended and condensed into two codes: the Public School and the High School Laws. And though by no means perfect, yet by common consent, it is felt by our public men that no further school legislation will be required for at least ten years to come.

It is not for me to enter into the vexed question of "Commercial Reciprocity" with the United States; but there are two subjects upon which we may enjoy the fullest "reciprocity" of thought, of feeling, of sentiment and heart, with our American friends, and those relate to matters connected with our common Christianity, and to "works of faith and labour of love," springing from a common philanthropy. And why is it that in matters of secular interest and of personal gain, the keenness and sharpness of the trader, the diplomacy of the statesman, and the gilded bait of prospective commercial gain, are all required to combine before both nations can find a common ground on which to lay the foundation of a system of "commercial reciprocity" between them? while in matters of a higher, nobler, and better nature, they can and do (as we have demonstrated at this Convention) enjoy the fullest and freest "reciprocity" of intellectual thought, of sentiment and heart, and of experience and labour? Because the one is human—of the earth earthy—the other is divine—the work of the blessed Master, consecrated to Him, and imbued with His spirit.

In the special matter of caring for and labouring for the deaf and dumb, it is not ours to utter that divine word *ephphatha*—so instinct with life and power as it fell from the lips of the Saviour, but it is ours to endeavour in every way in our power to ameliorate the sad condition of those who are so afflicted—to open up to them the springs of enjoyment—to break down the barriers, as far as possible, which separate them from the outer world, and to prepare them for the richer enjoyment of that better and brighter one above—of which it has been so truthfully and beautifully said, that—

"There we shall HEAR, and see and know,
All we desired or wished below;
And every power find sweet employ
In that eternal world of joy!"

At the conclusion of the speech-making, the audiences were invited down stairs into the fine covered market to partake of refreshments, which awaited them.

The evening was very pleasantly spent by all who were present.

On the second day,

Mr. O. D. Cook (New York) read a paper written by Alphonse Johnston, of New York, and entitled "The best means of teaching the idiomatic use of the English language." The paper was a splendid illustration of the results of deaf-mute instruction, being well and thoughtfully written, and marked by a great deal of originality of conception. The writer thought the subjects of study were, in educational institutions, generally too much huddled together. A mind whose attention was divided among too many objects, could not pay proper attention to any one of them. The quality of education would in general be found to be in inverse ratio to the number of studies. He contrasted favourably the European system of education with that of the United States, considering that in the latter there was too much cramming and consequent superficiality.

That he complained of had crept into the instruction of deaf and dumb in the United States, and the system had been greatly impaired in consequence. He advised them to make haste slowly, and not to flirt with knowledge, or they would not be likely ever to get married to it.

Mr. Porter (Washington) next read a paper on the use of the manual alphabet. He alluded to the power of expression with which it was possible to supplement the use of the alphabet, and pointed out the importance of every letter having a distinct form, according to the Normal standard, a form such as would be easily recognized and distinguished from others. He cautioned them against incorrect, slovenly modes of forming letters—faults which he said were quite common. Steadiness of the position of the hands was necessary. He also spoke of the importance of learn-

ing to manage properly the arm from the shoulder to the wrist. The energetic use of the arm and hand as a means of emphasis was not to be overlooked. The separation between words should be marked by a brief and barely perceptible pause, but in order to avoid misconception or confusion, no pauses should take place in the words themselves. Accent was of importance, and the grouping of words according to their sense, as in oral speech, should be attended to. The upward and downward movement of the hand might, without violation of rule in regard to steadiness, be employed to represent the upward or downward inflections of the voice in oral speech. Facility in the use of either hand should be striven for. In the teaching of this alphabet, thoroughness should be insisted upon from the first. He suggested that when the pupil was learning the alphabet, he might with advantage make use of a system of finger gymnastics. The training of the left hand should not be deferred, but should be carried out from the first. The reading of the signs, which should receive due attention, was not very difficult, even when they were made with great rapidity, provided, however, that they were, at the same time, made distinctly. As far as possible, and at as early a period in the instruction of a pupil as possible, the finger language should take the precedence of every other communication in the exercises of the school-room, and if elsewhere also so much the better.

Mr. Noyes read a paper on the same subject, written by a mute, George Wing, of Minnesota. The writer said he could not find language to characterize the committing to memory of long strings of words without at the same time appreciating the ideas for which they stood. This was an evil which it was necessary for the teacher to be continually guarding the pupil against. The teacher should also take care that the pupil does not falsely associate words with ideas. It should also be the aim of the teacher from the first to give the pupil a correct idea of every object about which he uses words, and the pupil should be required to shadow those objects in writing himself. The object was the substance, the word representing the shadow, and the substance should always precede the shadow.

Mr. Wilkinson (California) then addressed the audience as to the best means of securing to congenital deaf-mutes of average capacity, an understanding and an idiomatic use of the English language. He said that in every tongue there were a spoken and a written language, differing very materially from each other. In illustrating this assertion, the speaker gave some specimens of English and Scotch dialects, and the efforts of the interpreter for the deaf-mutes to follow him through these created considerable amusement. He ridiculed the use of what is "elegant English" to the neglect of colloquial language, and recommended the teacher of deaf-mutes to make the Saxon element of our language the foremost subject of instruction; and cultivate as far as possible in all exercises given to the pupil the phraseology of colloquial speech, to encourage the pupil to the use of a simple style of writing; while teaching him the meaning of Latin and Greek derivatives to encourage him to avoid their use; to teach pupils familiarity with verbal contractions, and to avoid unnecessary verbiage in answering questions.

Mr. E. G. Valentine (Ind.) read a paper entitled "Instructors and their Work." He said there might be an easy way of doing the work of deaf-mute instruction, but he thought no instructor had ever yet discovered it. If the instructor did his duty faithfully, he would be at work every hour and every minute he was in his school-room. Hence the instructor should have a good physical constitution. The duty of the instructor consisted chiefly in imparting a knowledge of language, and hence the instructor should have fine mental abilities, and be himself well acquainted with the intricacies of the tongue he teaches, conversant with the works of the best writers in that tongue, &c. The true instructor was always sensible of the impossibility of his doing his work as thoroughly as it should be done. Every instructor should have a good moral character, and it was desirable that he should have religious convictions, should be energetic and patient, diligent and faithful, correct in his habits, and able in all things and at all times to control himself. He should also be of a social nature, and have a love for children and a sympathy for misfortune. The writer considered the French system of instruction the only one by which deaf-mutes could be thoroughly taught, and he thought that the sign language should be used sparingly, and that in the English order. He spoke of the importance of good government being maintained by the instructor, and said that the teacher should be careful to show the pupil how to study—that he must not expect to learn if he does not fix his attention on the study before him, and prevent his mind wandering about the room. With reference to language, the writer had come to the conclusion that its acquirement was a mere mechanical process, and therefore the teacher should not require the pupil to devote too much time to that study, for some deaf and dumb pupils might receive instruction in it for seven years, and then not be able to use it well. The study of language should be varied with

others. The writer dwelt on the importance of the school-room being kept orderly and clean, and of personal neatness and cleanliness in the pupils being encouraged. He held that religious instruction should not be left for Sunday alone, but should be made a part of the duties of every day. He considered the teachers responsible for the moral and spiritual welfare of the pupil as well as for his instruction in secular subjects. He recommended the holding of teachers' meetings for the purpose of conference on matters relating to their profession. He discussed the question as to whether the instruction of deaf mutes was entitled to be called a profession, and came to the conclusion it was—that there was not a more respectable and honourable one, nor one which offered grander opportunities for doing good. He considered the instruction of deaf mutes a profession which offered great inducements to young men having the proper qualifications for the work. Some of those engaged in it received as good salaries as the Professors in their colleges. He regretted to say that the teachers in all their schools were not paid as liberally as they should be, but he hoped to see an improvement in that respect.

Mr. Carruthers (Arkansas) next read a paper on the development of strength of character. In deaf mute education nothing was so fatal to the development of character, as to be always receiving and never giving, as was the case in institutions of this sort; and after eight or ten years' drill in one of them, the capacity for receiving favours was unlimited. After being instructed, boarded and lodged, for this length of time at the public expense, the deaf and dumb pupil seemed to feel that society was responsible for providing for him, and had no higher ambition than to get a living by begging. It was the duty of the teachers to prevent the formation of such ideas as this in the mind of the pupil. Care should be taken to keep pupils posted on current events, and a love for literature of an elevating character should be cultivated in his mind. With a view to the development of strength of character in the pupil, his teacher should be virtuously inclined, and he should be religiously instructed.

Mr. Bangs (Michigan) followed with a paper on the extent of the responsibility of the teacher for the moral and religious character of his pupils. He stated that the teachers whose responsibility he intended to discuss, were those employed in public institutions for the instruction of the deaf and dumb. Having pointed out that the responsibilities of the teacher were limited by the relation of such institutions to the State, he went on to argue that the pupils should be taught only the fundamental truths of the Christian religion, and scrupulously guarded against becoming sectarians, or in fact of knowing anything of the distinction between creeds while under instruction.

A paper by Mr. Thomas Widd (Montreal), a deaf and dumb teacher, was next read by Mr. Coleman, of the Belleville Institution, the Rev. Thos. Barry, of Montreal, interpreting in the sign language. The title of the paper was "the moral training of deaf-mutes." The writer remarked that the care and attention at present paid to morality and religion in most of these institutions seemed inadequate to check or prevent to any great extent prevailing intemperance, immorality and improvidence among deaf mutes. The deaf-mute continued to require, more or less, according to the intellectual calibre, the friendly counsel and parental care of teachers and friends, throughout his career in the world. When he left school he found himself suddenly surrounded by all sorts of temptations new and strange to him, and if not carefully and properly trained in youth, soon fell a victim to snares and vices which led to the brink of the grave. The teacher of deaf-mutes was responsible not only to his God, but also to society for the proper discharge of his duty in the training of his pupil, which went very far to decide his character in future. Some teachers might give insufficient attention to morality and religion, in their eagerness to rush to higher secular attainments. An institution could not be too careful in the selection of its teachers. Some institutions for deaf-mutes had made their schools training places for teachers to supply other institutions, as soon as they were fitted for the work, and required a higher salary, thus keeping down the running expenses of the establishment. This policy could not be too severely condemned. Such institutions as these were the worst to which deaf-mutes could be sent for instruction and proper bringing up. He recommended the formation of temperance societies in every institution, and that every year a course of lectures on temperance, morality, and frugality should be given by the teachers, with a view to fostering a spirit of frugality and self-dependence. He also recommended that pupils should be taught the importance of depositing a portion of their earnings after leaving school in Savings Banks. This would prevent their becoming a burden on their friends and relations, and beggars on the streets.

A discussion then took place on the several papers, in the course of which

Dr. Peet said he considered the suggestion of Mr. Widd, with reference to the formation of temperance societies, an excellent one, as such societies were calculated to promote a public sentiment among the pupils.

It seemed to be the general opinion of those who took part in the discussion with reference to religious training, that there was ample ground for giving such training without touching on sectarianism.

Mr. Greenberger (New York) read a paper on the method of teaching articulation and lip-reading, in other words, a method of teaching the dumb to speak and to read from the motion of a second person's lips, what is said by the latter. Mr. Greenberger's method, which he explained to be an adaptation of the German system to the English language, is remarkably ingenious and philosophical, and whether the Convention considered it practicable or not, the exposition of it afforded both the members of that body and the visitors a great deal of interest. In the illustration of his method, Mr. Greenberger experimented on three girls belonging to the Belleville Institution, and although they had never received any lessons in either articulation or lip reading, the results of the tests were tolerably satisfactory. He made various vowel, diphthongal, and consonantal sounds, the girls watching his mouth as he did so, and then giving fair imitation of them. The voice in which they did this, sounded rather unnatural, but this was only to be expected of persons whose organs of speech have been unused for many years, and who are unable to hear their own utterances. Mr. Greenberger pointed out how the voice of pupils was to be improved. The tendency in each case was to pitch the voice too high. The direction to remedy this was conveyed in a gesture. Sometimes the sound which Mr. Greenberger would give would be sonant when it should be whispered, and *vice versa*. For instance, if he gave the sound of the letter "p" without the vowel, which, for the sake of ease in pronouncing it, usually accompanies it, the girl would repeat it in combination with a vowel, the latter generally preceding the consonant sound. To correct this error, he would place the hand of the girl on his throat, and repeating the consonant in combination with a vowel as she had done, he would shake his head as much as to say "that's wrong." He would then give simply the consonant sound, and indicate that that was what he wanted. In the one instance the girl would feel the vibration caused by the passage of the air through his epiglottis, and in the other she would miss this accompaniment, and would at once be able to do tolerably well what was required of her. The chest, the top of the head, the throat, and the jaw, were all used in showing when there was vibration, and when none, the place on which the girl's hand was put varying with the different sounds. Mr. Greenberger explained that the simple vowel sounds were those which in a course of instruction were first taught to a pupil, and that from these he was gradually advanced to diphthongs, consonants, &c.

Mr. A. Graham Bell (Boston) followed Mr. Greenberger in an explanation of a system which he calls "visible speech." Mr. Bell, who is an Englishman, and who is not altogether unknown in Canada, stated that visible speech was invented in England by his father, who is at present a resident of Brantford, Ont. It was originally intended to be employed for philological purposes, to enable persons to acquire the pronunciation of foreign languages, without the necessity of hearing them spoken, but the idea had suggested itself that if it were possible to do this, it might also be used in teaching the deaf and dumb to speak. He held that if it were possible for deaf-mutes to learn to speak simply from seeing the motion of the organs of speech, they would early learn to speak themselves; but this they could not do because some of the operations of the vocal organs could not be seen. He contended that the vocal organs of the deaf and dumb were the same as those of persons who spoke, and that the only reason why they were dumb was simply that they were deaf, and therefore unable to learn as do other children by imitating the sounds of language uttered by others. Talking machines, which had been invented so as fairly to imitate human speech, showed that talking was merely mechanical, and that therefore all that they had to do in order to get a dumb person to speak, was to get him to put his vocal organs into the proper position. Mr. Bell went on to explain his system, which is based on ten simple linear signs, one representing the tip of the tongue, one the top of the tongue, one the nose, &c. The combination of these represents the different vocal organs in different relative positions, and producing sounds or not as the case may be. For instance, one combination may indicate that the tip of the tongue is to touch the roof of the mouth, the lips to be held slightly apart, and a sound made with the organs in that position. Mr. Bell claims that any sound the human voice can produce, can be represented by the characters of his system, and that from these a person who knows the latter can exactly reproduce the sound, though he may never have heard it, and certainly, judging from the experiments made to-day, it would seem as if this were so. A young lady who was with

the Professor, and who assists him in teaching the system, was sent out of the hall, and then a request was made that words in any language should be spoken, or sounds of any sort uttered. Words in Greek, German, Indian, Latin, and Irish were given, and some of the most extraordinary sounds ever heard were made. Mr. Bell analyzed them as well as he could, and represented them on a black-board by the characters of visible speech. The young lady was then called in, and repeated all the words, and imitated all the sounds with striking exactness. Some of the sounds given were of such a nature that it was cruel to ask the young lady who was taking part in the experiment, or any other lady, to imitate them, and the only one which she did not repeat very well, was one which a delegate said he thought it was impossible for any lady in the room to imitate exactly, a remark which brought from Mr. Bell the remark, emphatically spoken, that he did not think that any gentleman in the hall could imitate it either. These experiments were provocative of a great deal of mirth. Mr. Bell stated that it had been found by tests made in England, that deaf mutes could, without difficulty, be taught the meaning of the characters of the system, and that this had been further proved by its use in several institutions in the United States, into which it had been introduced. A diagram which he had with him showed how easily this could be done, the characters being placed on a sectional drawing of the human head, beside the organs which they are respectively intended to represent. Mr. Bell showed, in the course of his demonstration of the system, how he could by certain very expressive gestures and positions of his hands and fingers, give a deaf and dumb pupil directions with regard to the pitch, quantity, and inflexion of sounds. The explanation of the system was listened to, and the experiments were watched, with the greatest interest.

Mr. Schelling was called on for his views with regard to articulation, and stated that he considered it a waste of time to teach it to congenital mute persons.

Mr. Hubbard told of a little girl of his own, who had become deaf before she had learned her own language, but whom he had taught to do so. She was afterwards taken to Germany, and there a German lady, who did not know any English, taught her to speak the former language by the same method. He also read a letter written to him by a little English girl who had been born deaf and dumb, but who, having been for two years receiving instruction in articulation, now informed him that she was speaking a good deal.

The Convention adjourned at half-past six o'clock.

In the evening, Dr. May, of the Educational Department, Toronto, gave an exhibition of philosophical experiments, accompanied by a lecture, to a large audience, consisting of the members of the Convention, and a considerable number of persons from the town. The lecturer had with him a great amount of apparatus, with the aid of which he gave an entertainment which was both instructive and interesting.

Prof. Snider (Illinois) proceeded to read a paper on school economy. He said that his subject might be considered under two heads. First, economy of time; second, economy of force. He spoke of the importance of economy in the time of the pupil, that being the deaf and dumb pupils' only stock-in-trade—knowledge, judgment, and wisdom being wanting. It was not difficult to get such pupils to make good use of their time, for in most cases the deaf and dumb child himself saw by the time he was twelve years of age the disadvantage he was under as compared with children who had the faculty of speech. The greatest difficulty was to keep the pupils interested in the work. One way of doing this, which he recommended, was to make the pupil feel as much at home at school as possible. He pointed out that in order to keep the pupil interested, it was important not to exhaust his force. The teacher's time should not be wasted either, for time lost to the teacher was lost to the pupils as well. On this point the writer gave a number of hints of value to those engaged in the instruction of the deaf and dumb. Similar hints with regard to the economy of the teacher's force were also given.

Mr. Williams (Connecticut) read a paper on the question, "How shall we induce deaf and dumb pupils to read?" He disapproved of teaching such pupils mere lists of words for a long time, and recommended that as soon as they had learned a few nouns they should be taught some verbs, and then be at once required to combine the words they had acquired into sentences; he also recommended giving the pupil, as soon as possible, short and easy stories to read, and large and increasing difficult, but always interesting ones, as the pupils advanced.

Dr. P. G. Gillett (Illinois) read a paper entitled, "The location, site, buildings, materials and appliances of an institution for the deaf and dumb." He said perfect results of labour can only be obtained with proper appliances. No man could be proficient in many professions; it being true that the "Jack of all trades is master of none." Adequate means should be sought after in manag-

ing deaf-mute institutions. Particular attention should be paid to location, as an undesirable one often defeated the very objects for which the institution was founded. He recommended that institutions should be built in the capital of the Province or State, as such afforded much better advantage than did a country town. The acceptance of a bonus from any corporation for establishing an institution in any place was vigorously denounced as being somewhat in the character of trafficking in human misfortune. For an ordinary institution eighty acres would be required. Whatever other advantages a location possessed, its healthfulness should be the greatest inducement. An abundant perennial supply of water should be easily obtained—perfect sewerage should be an essential element in the desirableness of an institution. Beauty in construction of buildings, and a display of the landscape gardener's skill was especially urged, as the deaf and dumb received very great impressions from what they saw. He advocated the establishing of printing offices, bookbinderies, and workshops; also, conservatories for the cultivation of flowers and fruit. The present system of dormitories was also objected to. The paper was of great practical value, and well received by the delegates.

In the course of the discussion Mr. T. H. Gallaudet advocated the establishment of numerous small schools for the instruction of deaf-mutes, in lieu of the large institutions which now exist.

USE OF NATURAL SIGNS.—A discussion on a motion in amendment to the motion made on Thursday, in favour of a class in each institution, being as an experiment instructed without the use of any but natural signs, then took place. The question as to whether natural signs or the spelling of words by means of artificial signs made with the fingers should be given the preference seems to be one of much interest among the instructors of congenital deaf-mutes, and was discussed with a certain degree of warmth. One gentleman, who was an advocate of natural signs, suggested that it was a question for them to consider, whether they were not rendering themselves liable to be prosecuted for cruelty to animals if they required a number of deaf and dumb children to sit staring at them all day, while they spelled out every word with their fingers. Another gentleman, himself a deaf and dumb-mute, approved of natural signs, which he considered the language of the deaf-mute. Another deaf and dumb gentleman, Mr. Green, of the Ontario Institution, approved of a trial of the sign-language being made, in order that the question might be settled; but he admitted that the use of signs often led to errors by pupils in the use of the alphabet. Another deaf-mute, who said that like himself, his grandfather, his grandmother, his father and his mother were born deaf and dumb, but that his own child was not, expressed himself in favour of the employment of signs.

A paper upon the "Home education of deaf-mutes," written by Mr. D. H. Carroll (Minnesota), was read by Mr. Noyes. The writer asserted that there was a lamentable ignorance among deaf-mutes, not an account of any infirmity of intellect, but because their mental improvement was neglected by those who were responsible for it. He recommended employment of agents by the Government to search for deaf-mutes, and when one was found that the agent should remain in the child's family for a few days and commence its instruction, and show its friends how to continue its training. In this way they could be prepared for the college established for the benefit of that class, and the advantages they would derive at these institutions would be an inducement to the parents of other deaf-mutes to send their children for instruction.

At the request of the Business Committee, Dr. J. G. Hodgins, Deputy Superintendent of Education for Ontario, was called on by the President to address the Convention, he said—

Mr. President,—I have already in another place conveyed to you, sir, and to the ladies and gentlemen of this Convention the cordial greetings of the Education Department with which I have been for many years connected. There are, however, a few things on which I should like to occupy your attention for a short time. I have listened with much pleasure to many papers on subjects of a common interest which have come before the Convention. And although I might not concur in all of the sentiments expressed, or in some of the conclusions arrived at in these papers, yet I feel that the fact of so many distinguished gentlemen having been gathered together from various parts of the United States to exchange opinions, and to discuss questions of vital importance connected with the education of the deaf and dumb, is not devoid of special significance in behalf of that unfortunate class; nor can those discussions fail to be of the greatest interest to the common cause of education.

It is not my purpose to occupy the valuable time of the Convention, but it has occurred to me that very many of the Delegates present would like to learn something of our system of public instruction in this Province. I shall, therefore, refer to some of its chief features, but to those only in which our system of education differs somewhat

I believe from that of any with which I am familiar on this continent.

First.—Our school system in Ontario differs from any in your country in this important feature:—The Executive Head of the Education Department is a permanent and non-political officer. The distinguished gentleman who presides over the Department at present, Rev. Dr. Ryerson, has filled his present position, with great acceptability to the people and service to the country, for thirty years.

Second.—The second peculiarity is that, on the same days and during the same hours of these days, a uniform examination is held simultaneously in every County and City in the Province, at which every person aspiring to the office of Teacher for the Public Schools is required to be present and to pass satisfactorily before he can receive a legal certificate of qualification. The examination questions are prepared by a central authority and sent out under seal, which can only be broken when the candidates are assembled for examination. Upon the result of these examinations, according to a common value assigned to each question by the central body, certificates issue from the Local Boards to 2nd and 3rd Class Teachers; while all who aspire to the highest position of First Class Teachers have their papers sent up to Toronto to be there adjudicated upon by the central authority. A uniform standard of excellence for the Teacher is thus maintained throughout the Province, while personal preferences and local favouritism for candidates have little or no place in such a system. As a further safeguard against it, the whole of the written answers of every candidate for a certificate of whatever grade are sent to the central office at Toronto, to be examined if necessary, should any doubt arise as to the strictness and impartiality of the examination, or should any appeal be made against the decision of any Local Board of Examiners in any particular case.

In the same way uniform examinations are held simultaneously all over the Province for the admission of pupils from the Public into the High Schools or Collegiate Institutions.

Third.—The third feature of divergence from the American systems of education is one which will no doubt touch the sympathies of those present. It is the beneficent provision which has been made by the Legislature of the Province for the support and comfort of worn-out and superannuated School Teachers. Every Teacher of sixty years of age who has subscribed to the fund has a right to retire from the profession and to receive a sum of not less than six dollars per annum for each year of service in the Province as such teacher. Those under sixty may, under certain conditions, retire on the same terms.

Fourth.—The fourth and last feature to which I shall call your attention is that relating to the compulsory education of children. As the Legislature has finally determined that every Public School in the Province shall be free to every child of the neighbourhood, so, as a necessary complement to such a system of free schools, it has declared that every child is by law and of right entitled to at least four months' teaching or schooling; and that every parent denying his child that right shall either be fined before a magistrate, or submit to a rate of one dollar a month for every month of such denial or neglect. The law makes it compulsory on the Local School Trustees to enforce this law, either by means of a fine or rate bill on the neglecting parents.

I may mention another feature of our School System which is somewhat peculiar. I refer to the facilities which the Department has provided (of which you have had a specimen in the attractive museum in the adjoining room), by which the Schools are supplied from a central depository with maps, charts, apparatus, library and prize books, and other appliances for the Schools and School-rooms.

In reply to a question by a Delegate, Dr. Hodgins explained that all Teachers before receiving a license to teach were required to present to the Examiners a certificate of "good moral character," signed by a clergyman or other responsible party. He also explained, in reply to another question, what were the provisions of the law in regard to religious instruction in the Schools, and the promoting of education in the remote and outlying Districts or Territories of the Province.

On motion of Rev. Dr. Gallaudet, of New York, the thanks of the Convention were tendered to Dr. Hodgins for his address.

Dr. E. M. Gallaudet (Washington) then addressed the Convention on deaf-mutism. He said they might use the term deaf-mutism with reference to the different phases of the disability—mental, moral, and social. Deaf-mutism arose out of a child's lack of language of any sort, even signs. This lack was what they as instructors proposed to supply. The deaf-mute himself and his friends supplied it to some extent, and the deaf-mute's mind then began to develop, but owing to the crudeness of the language he used before going into an institution for instruction, his mental progress was very slow. After a few remarks on moral deaf-mutism, the speaker

went on to treat of social deaf-mutism. If a deaf-mute were mentally improved, so that he could read and thus become qualified to confer with others whose minds are developed, he would seek his associates among hearing and speaking persons, and would not be clannish with other deaf-mutes. Deaf-mutes would be more welcome in the world of hearing and speaking people than they imagined, if they would only make some effort to associate with the latter. He thought the marriage of a deaf person with another deaf person, rather than with a person who can hear, should be discouraged, and he disapproved of newspapers specially designed for deaf-mutes. He urged the importance of greater precision on the part of teachers with regard to what they taught their pupils, and a greater care that when the latter left school they were self-dependent.

Mr. Wing presented a paper on the physiological peculiarities of deafness, which was read for him by Dr. Peet. In connection with the paper, Mr. Wing exhibited a particular kind of ear trumpet, which was represented as an unusually excellent one.

Mr. Hutton (Nova Scotia) read a paper with reference to the means employed by the late Duncan Anderson, to teach those deaf-mutes with suitable organs to articulate. Anderson dissected and constructed models of the organs of speech, so as to show their reciprocal action in the combination of vowels and consonants. He then contrived a system of notation, whereby these combinations were indicated to the eye in such a manner as to enable the teacher to practice the pupil in articulation, or the intelligent pupil to acquire the art by his own persevering study. Anderson obtained tongues made of plaster of Paris, and then coloured them red in different positions to represent each letter. Then, if he wished, for example, to explain how the letter "L" was pronounced, he took up a long, thin tongue and put it under the left hand, supposing the latter to represent the upper part of the mouth, and then let the pupil know that was the proper way to pronounce the letter "L." Similarly if he desired to indicate the proper way of pronouncing the letter "M," he took up and showed to the pupil a broad tongue. He also used a skull in addition to the tongues. Some letters would perhaps require an explanation in a different way; for example, to enable the pupils to understand how the letter "R" is spoken, the teacher might place his hand on the pupil's throat, and the latter would easily learn how to pronounce it. Anderson also made use of a system of notations for the purpose of indicating quantity and quality of tone.

Mr. Bell presented, for the consideration of the Convention, Dalgton's method of intercommunication between the blind and the deaf and dumb—a method which he suggested might be employed by deaf-mutes in conversing with each other in the dark. A knowledge of this method is conveyed by means of a glove with the several letters of the alphabet, printed on it in different places, and when a person wishes by it to communicate with another he spells out what he wishes to say, touching the places on the latter's hand, corresponding with those on the glove on which the necessary letters are printed. For instance, some of the letters are on the ends of the fingers, each of the joints bear others, &c. Mr. Bell said that he had found, from giving the method a trial, that it had special advantages in the direction he indicated.

On motion, W. J. Palmer, Ph. D., Messrs. B. McCann, and D. R. Coleman, of the Belleville Institute, were appointed a committee to whom should be entrusted the minutes and papers of the Convention for publication.

Mr. Talbot (Iowa) read a paper on the limit of the number that should be taught in one class. He said that a wise economy of time and force required that the largest possible number should be taught in one class, but this did not mean as large a number as were commonly taught in speaking classes. Twenty deaf and dumb pupils in one class, kept an active teacher fully occupied. The number in a class might depend greatly on the uniformity of the capacity of the pupils and on the teacher's activity.

Mr. Hammond (Indiana) followed with a paper on geography. He considered this an excellent study for the deaf and dumb, as it tended to the development of faculties which it was very important should be cultivated in persons thus afflicted—those of memory and observation. The writer gave some good hints with regard to teaching geography to deaf-mutes.

Mr. Bangs read a paper by Mr. Brown, of Michigan, on text books. The hints given in the paper were excellent, but of course they were only of special interest and importance to teachers of the deaf and dumb.

A discussion then took place on the foregoing papers, in the course of which the Rev. Dr. Turner, President of the Convention, spoke very favourably of the old-fashioned natural sign-language, giving instances of persons having been educated by means of it, and it alone, and having become eminent scholars. Among them was the writer of the last excellent paper, an essay which he thought would do credit to any one. He asked those who were opposing the na-

tural sign language, not to pull down the old land-marks until they got something better. Mr. McGann strongly advocated progress in obtaining modes of expression for deaf-mutes. He thought they should endeavour to improve the present system and not to go backwards, and make use exclusively of the old natural sign-language. Dr. Peet remarked that the deaf-mute, when thinking about any action, did not do so in accordance with the English order of language, and he would as early as possible endeavour to get them to think in the English language. If he could get them to do this, it would not hurt them, the pupils, to use signs. He considered the translation of sentences from signs into the English idiom equally as good a mental exercise as translation from Latin into English, and *vice versa*. While wishing to have deaf-mutes think in the English language, he was not in favour of discarding the sign language, but of further improving it.

A Committee was appointed to devise signs for numerous short words now in common use, and for which there are, at present, no such signs, and teachers were requested to send to the Committee all such words as they might meet with.

The museum was open during to-day, and was one of the great attractions, if not the principal one. Many of the gentlemen from the United States, who have spent many years in some of the most prominent educational institutions in that country, expressed surprise at the completeness of the museum, and the great variety of articles exhibited therein; yet what was shown was only a small selection from the beautiful Educational Museum in Toronto. Among the articles were some charts and books on the subject of deaf and dumb instruction, but most of them were objects, apparatus and charts collected from different countries in Europe and America, by the Educational Department of Ontario, not specially for the instruction of the deaf and dumb, but in many cases well adapted for that purpose.

It is very interesting to visit the workshops in connection with this institution. In one of them about twenty-five boys are engaged at shoemaking, not only for this but for various other Government Institutions in the Province. Since August last, there have been made there and sent away, in addition to the shoes used here, 727 pairs, and the work has all been done by hand. In the cabinet and carpenter's shop, desks, tables with turned legs, window sashes, &c., are made. Painting and glazing are also done in the shops.

BELLEVILLE, July 19.

The Convention re-assembled this morning at ten o'clock, when a religious service in the sign-language took place, the Rev. D. E. Bartlett, of Hartford, conducting the service. In opening with the Doxology, "sung" in manual signs, the assemblage, or that portion of it which was capable of making use of that mode of expression, taking the time from the conductor. This mode of praising the Almighty, merely making motions, is very strange to those accustomed to hearing human voices swelling and blending into loud harmony aided by the organ's solemn tones. The Lord's Prayer was next repeated in the same way. Mr. Bartlett then delivered a discourse from the text Exodus iv., 7. The preacher expressed himself almost entirely in natural signs, seldom spelling a word with the sign alphabet, and the audience, with the exception of the few uninitiated present, or more correctly the spectators, evidently understood him well. The representatives of the various institutions were then severally called on, and stated their methods of conducting religious service. This continued till one o'clock, when the Convention adjourned until eight o'clock in the evening.

At three o'clock a special service for deaf-mutes was held in the St. Thomas Anglican Church. The majority of the members of the Convention and a great many others were present. The services were conducted *viva voce* by the Rev. Mr. Burke, the incumbent of the church, but the Rev. Dr. Gallaudet, of New York, who is a clergyman of the Protestant Episcopal Church of the United States, and who, like the Rev. Mr. Burke, wore a surplice on this occasion, stood beside the latter and interpreted in the sign-language everything he uttered, the liturgy included. A feature of the service was the baptism by those two clergymen, of a child of two deaf-mute parents residing in the town. It had been ascertained as a fact, which may interest some, that the child is not deaf. After the baptism, the Rev. Mr. Burke delivered a very appropriate address, directed principally to the members of the Convention.

He was followed by the Rev. Dr. Gallaudet, who gave those present not deaf and dumb instructors, a history of the New York Church Mission for deaf-mutes, Rev. Mr. Berry, of Albany, interpreting him in the sign-language. The mission, it seems, is designed to give religious instruction to the deaf-mutes residing in the American metropolis, and to afford them opportunities of worshipping together. In the course of his remarks, Dr. Gallaudet stated that he had been among deaf-mutes all his lifetime, since both his mother and his wife were deaf and dumb. At the conclusion of the service

a collection in aid of the New York Mission was taken up, and, without any intimation of it having been given, about \$27 was received.

At eight o'clock in the evening the Convention resumed, and another model service was held, Drs. Peet and Gallaudet (Washington) conducting. During the course of the service, Dr. Peet repeated the Lord's Prayer and the hymn beginning, "O for a thousand tongues to sing," the spectators following him in the same way as that which they followed Mr. Bartlett in the morning. Dr. Peet then wrote the first five commandments on a blackboard, and commented upon them. Dr. Gallaudet followed with an address on the 2nd verse of the 14th chapter of John—"In my father's house are many mansions." After the address, the hearing of statements from representatives of institutions, with reference to the mode of conducting religious exercises therein was resumed, and occupied the Convention until the close of the session.

On Monday morning the Convention were invited by the Councils of Prince Edward County and Picton to a pic-nic at the Sand Banks, on the shore of Lake Ontario.

Almost all the members of, and visitors to, the Convention went upon the trip, which by water extended as far as Picton, and as the boat proceeded down the beautiful bay, the charming scenery was greatly admired. The steamer reached Picton about eleven o'clock, and its passengers were met by J. H. Allan, Esq., Mayor of the town, and by a sufficient number of carriages to convey them across the Peninsula to a spot called the Sand Banks, on the shore of Lake Ontario, a distance of about ten miles. These carriages were, with a commendable public-spiritedness, brought in from the country by farmers, and supplied by persons residing in the town. As soon after the boat arrived as the excursionists could get into the carriages, a procession of the vehicles, about 75 in number, was formed, and headed by the Picton band in another waggon, started for Picton. A band which had come down from Belleville and discoursed music at intervals on the trip, also occupied a position in the procession. The party reached the Sand Banks about one o'clock, and found there a large crowd of residents of the county assembled to entertain the visitors, and to take part in their pleasure. Excursionists and guests together, there must have been on the ground at this time twelve or fifteen hundred persons.

The first business was the presentation, by Mayor Allan, of an address of welcome to the Convention, on behalf of the town of Picton, and a similar one by Mr. Joseph Pearson, Warden, on behalf of the County of Prince Edward. To both addresses Rev. Mr. Turner, President of the Convention, made a suitable reply. A most excellent and bountiful dinner was then served to the whole party on a very long table, spread in a beautiful grove.

After dinner, a formal meeting of the Convention was held beneath a large tree on the top of one of the highest sand banks, at which votes of thanks were passed to the Grand Trunk and Great Western Railway Companies for reduced fares; to the owners of the steamer *Rochester*, for special favours; to the people of Belleville, and to the Corporation of that town, for their generous hospitality; to the Government of Ontario, for similar kindness; to Dr. Palmer, the Principal, and other officers of the Belleville Institution, for the kindness shown by them to the members of the Convention; to the Wardens and County Councils of Hastings and Prince Edward, for entertainments; to the Reporters, for full and accurate reports, and to the Presidents and Secretaries of the Convention, for the manner in which they had discharged their duties.

After this meeting, another, presided over by Mayor Allan, took place in the grove, at which addresses were delivered by Walter Ross, M.P., G. Striker, M.P.P., Mackenzie Bowell, M.P., K. Graham, M.P.P., Dr. Boulter, M.P.P.; Mr. Mordan, Mayor of Napanee; Dr. Hope, Belleville; Dr. Hodgins, Toronto; Rev. Mr. Bennett, New York State, several members of the Convention, and others. The American delegates, in their addresses at both meetings, expressed themselves, as they had done on previous occasions, as delighted and somewhat surprised with this country, and with the unexpectedly generous manner in which they had been received and entertained since they had been in it, particularly by the people of the towns of Belleville and Picton, and of the Counties of Hastings and Prince Edward.

At the place at which the pic-nic was held there is one continuous field of fine, white sand about half a mile in length, and extending back from the Lake about a quarter of a mile. The sand rises here and there, and it is said to be in some places twenty and thirty feet deep. There are other similar banks along this side of the country. During the afternoon some one dug a short distance down into the sand, and came upon a great quantity of snow-balls, which were exhibited about for some time as great curiosities.

The party left the Banks on their return to Picton about five o'clock, and most of them by a different road from that by which they went out, so that they had an excellent opportunity of judg-

ing of the character of the country. Both out and in, the country through which the visitors were driven was extremely beautiful, and was greatly admired by them. Prince Edward is certainly such a fine county, that there is no wonder at persons taking their first drive in the Province through it, being most favourably impressed in favour of the county, as were the ladies and gentlemen from the United States who went through it to-day. A more beautiful farming country, or one with finer roads, more charming woodland scenery, better or more comfortable farm houses (chiefly brick and very fine wooden ones), or more respectable-looking and intelligent people, it would scarcely be possible to find in the world. Evidence of prosperity and taste abound everywhere. The great number of large milk cans to be seen in the vicinity of the farm houses indicate the extent to which cheese making is engaged in this county. One thing in which the example of the people of Prince Edward County might well be followed is in planting trees along the roadsides. Nearly the whole length of both the roads traversed by the excursionists was a beautiful avenue formed of trees, chiefly maple, of ten or twelve years' growth, and thirty or forty feet in height, and through which charming vistas here and there presented themselves. The number of private burial places which are to be seen in driving through the county was remarked upon.

The excursionists left Picton on their homeward trip about nine o'clock, and reached Belleville shortly after midnight, every one expressing himself or herself delighted with the pleasant day they had spent, and the beautiful country they had seen.—*Globe and Mail Reports.*

I. Papers on Practical Education.

1. THE TEACHER.

GRACE A. BROWN.

I have read a charming story,
From a book you may not know,
A tale of a gentle teacher
Who taught long years ago ;
He lived in a wonderful country,
Which lies in the sun-rise glow
So near to our poor lost Eden,
'Tis darkened e'en now by its woe.

This teacher's school-room was lofty,
For it reached the heavens they say ;
And his words so tender and earnest
Lie warm in our hearts to-day.
He told grave truths on the mountains,
And beautiful things in the valleys ;
And fair were his object lessons
From grasses and lilies.

'Tis hard to believe that *His* pupils
Could tire or listless grow ;
For He listened to all their yearnings
And sorrowed in all their woe.
But this book tells a strange, strange story,
O'er which one might wonder and weep ;
That while teaching the grandest lessons,
Some wearied and e'en fell asleep.

O, Teacher, whose sweet, clear voice
Rings down through the changing year
With the scent of the grasses and lilies—
A balm for all doubtings and fear,
Give, O give us a share of the patience
Which made Thy brief life so sublime !
The love and earnest devotion
Which gild the grey shadows of time.

2. ASTRONOMICAL GEOGRAPHY.

For the benefit of that class of teachers who are forever proposing puzzles or "gags" at teachers' meetings, and in their schools, we copy the following questions. They were propounded in a Rhode Island institute a year ago ; and of a hundred and four answers, it is said that only forty-seven were correct :

1. On the 23d day of February, at noon, which way will a person's shadow fall,—he standing upon the Tropic of Capricorn ?
2. At the same time which way will his shadow fall,—he standing upon the Equator ?
3. On the 21st of June, which way,—he standing at the North Pole ?

4. On the 20th of June, is the day longer or shorter at Montreal than at New York City ?

5. A boy stands at the North Pole and throws a stone at an object. Which way will it probably go ?

6. On the 21st of March, is the night longer or shorter at St. Petersburg than at Rio Janeiro ?

7. On the 21st of June, is the day longer or shorter at Boston than at Baltimore ?

8. On the 15th of October, is the day longer or shorter at Montreal than at New York ?—*Michigan Teacher.*

To leave children at intermission without oversight, is wrong. The teacher should always be on the premises when the children are there. Supervising their plays is as important as supervising their studies.

II. Education in Various Countries.

1. VOTE FOR ENGLISH EDUCATION.

The vote asked from the English House of Commons for the State Education Department for the present year was £1,356,852 sterling, and it was granted without a dissentient voice. It is true that this sum was but £57,000 in excess of the preceding year, but a fair idea of the great progress which has been made in this educational movement will be got from the fact that thirty-five years ago the Education Department of the State was started with £30,000. Yet the maximum is far from being attained, and we have no doubt that as the people find the expenditure brings in rich returns, they will pay their money still more cheerfully. At present there are 2,200,000 boys and girls receiving instruction, but it is anticipated that by the middle of next year England and Wales will be provided with schools for four million children, of whom 2,500,000 will be educated in voluntary schools receiving grants, 1,000,000 in those not receiving grants, and 500,000 in the School Board establishments. Lord Landon, the Educational Minister, in asking for the vote, remarked upon the difficulties interposed in the way of this grand movement by the struggles of religious bodies. "He could not help sometimes fancying," he said, "that the great mass of the working population watched them with eager gaze while they were quarrelling and struggling about the education of their children, and he could not but express his earnest conviction that that Church and that religious body which showed most entirely an impartial spirit—not that which showed grasping desire to draw people by means of the national funds into its fold, but the Church which thought least of itself and most of the children to be educated—would be the one which would ultimately win the suffrages of the population."

2. IRREGULAR SCHOOL ATTENDANCE.

Few people are aware, or are in a position to avail themselves of the mass of interesting facts and valuable information contained in our public documents and parliamentary blue-books, which, though they cost large sums, and are ably drawn up by persons entirely conversant with the subject on which they exhaustively treat, remain as it were sealed volumes to the bulk of the community. Copies are distributed to newspaper editors and members of parliament, by whom, owing to the ceaseless pressure of modern journalistic and political life, they, perhaps, not seldom remain unread, or are only cursorily glanced at. But for the generalality of people they are as if they had no existence. These compilations are not in Canada on sale to the public as in England, where at an office in Duke Street, Lincoln's Inn Fields, every parliamentary paper can be obtained by anybody, at a price per folio, fixed by statute, and which cannot be exceeded by the printers. From this ignorance of the important facts contained in official records of things as they really are amongst us very misty or unfounded notions are prevalent respecting matters which, in the light of official revelations, are found to be very different from the popular conception. This remark is specially applicable to our reputed educational position and rate of progress. In these respects not a few persons have a fixed idea that we are all we should be—a model to the nations of the world—especially to the benighted countries of Europe. Certainly, in theory—or as it is often expressed, "on paper"—we show excellently well. But when we come to closely inspect the practical developments exhibited year by year in the bulky volume compiled by our veteran Chief Superintendent, we are confronted with a crowd of facts as indisputable as ugly, which send our buoyant ideas far on the road to zero. One of the most valuable portions of this comprehensive educational digest embraces

the reports of the Inspectors of Public Schools. It would not, we think, be a bad plan to circulate these reports every year, in a separate pamphlet, so that they might have a better prospect of coming before the eyes of all concerned in the facts they disclose—especially of parents. The sum of the workings of our educational machinery, as fully set forth in many of these reports, is not cheering; sectional bickerings, jealousies and struggles; teachers and trustees at continual cross-purposes; teachers ever coming and going; schools unfit for health, decency, or comfort; salaries screwed down as low as possible; thousands of children not at school anywhere; other thousands attending only a few days in the year. This last is described by Mr. Platt, Inspector of Prince Edward County, as “the greatest of evils.” Its giant proportions may be seen by a simple glance at the following digest:

Public Schools of Ontario, 1872.—School population between five and sixteen years of age, 495,756; number attending school, 454,662; number attending less than twenty days in the year, 51,075; twenty to fifty days, 93,333; fifty to a hundred days, 123,568; a hundred to a hundred and fifty days, 97,136; a hundred and fifty to two hundred days, 71,270; two hundred days to the whole year, 17,748.

Thus, out of 454,662 reported as “attending school,” 267,977 were only present for three months, and that made up of broken periods! What approach to “education” can there be under such a system? Mr. A. McNaughton, Stormont County Inspector, reports that this irregular attendance is a serious evil, “a subject of general complaint among teachers,” and “is increasing rather than diminishing.” Other inspectors make similar references. They denounce also the “cheap teacher” system, and the frequent changes of teachers, accruing from the low estimate put on teachers’ work by trustees and people, and the consequent low standard of payment. In many sections “any sort of teacher” will be engaged if his or her salary can be screwed down below that of a qualified trainer.

Doubtless, the prominent evil of irregular attendance, both in town and country, but in towns especially, is in some degree owing to the extreme difficulty of providing for a numerous family out of the father’s moderate earnings. This difficulty, like a strong *chevaux de frise*, meets the advocate of compulsory education in his first move forward, and is not easily surmounted. Dearthness of necessaries, high rents and fuel, sickness, interruptions of employment, and limited earnings when employed, may account for much of the irregular attendance complained of. When the education is entirely free, the same thing happens, and owing to the same causes. The children are required for trifling errands, or work by which they can earn a small sum; or the mother goes to work and leaves an elder child to take care of the younger ones; or a child has none but ragged clothes, or the whole family is in straitened circumstances. Even if it be proved that, as often is the case, these are due to the bad conduct of one or both parents, the children are to be pitied all the same—or rather all the more—but it is still equally difficult to find a remedy. In fact, in most instances, no remedy would suffice short of taking away the children from their parents—a step which would involve the necessity of supporting them. Moreover, making every allowance for misconduct and mismanagement, we do not think it is sufficiently considered how very hard a pinch it is, at present prices, even with regular employment and wages of \$7 to \$10 weekly to support and educate a young family—especially in a large town. Thus, in a letter in a Hamilton newspaper, we read: “My husband earns one dollar and a York shilling a day. House rents are high; firewood is expensive; and with six children continually appealing to our slenderly-filled purse, you may be sure a good deal of domestic economy has to be practised before I can get all ends to meet.”

Having said this much, something has to be added on the other side. It must be admitted that much of our sad school irregularity is owing to the culpable negligence of parents, especially of the mother; for the most trivial reasons she will detain a child from school, perhaps on the first and second days of the week, and then because they have been absent on those two important days, concludes they may as well stay away the rest of the week. Often the breakfast is not ready in time, or the clothing has to be prepared, or some little errand has to be performed, and then it is “too late.” Many women are themselves so imperfectly educated, and so incorrigibly indifferent or ignorant, that at best they only regard school as a place for children to be out of the way when they cannot be put to the slightest use at home. When the mother happens, unfortunately, to be of this hopeless order the father’s wishes do not stand for much. His intentions may be good, and his views enlightened, but if thwarted by the ignorance and stupidity of his wife, the children will not get much education. We are convinced that the ignorance of the mother has much to do with the bad attendance of which teachers everywhere complain.

A woman really awake to the importance of education, so far from creating or easily giving way to obstacles, will do her utmost to remove any which may arise. And further she will endeavour in other ways, which will suggest themselves to every intelligent mind, to stimulate the children to persevere to their utmost in making the best use they can of the short time during which, in the nature of things, they can hope to remain under instruction. School reformers in England confess that the extremely low state of education there among the working classes has long been most of all owing to the deficient education of the girls. The education of boys has been admittedly neglected. But that of the girls has been far worse. When these girls become women they, as wives and mothers, perpetuate their own ignorance to another generation. It will be a bright day for the world when every mother, in all countries, has sense to see the overwhelming importance of education, and has the inclination and ability to assist in promoting it. Among ourselves a proportion of over fifty per cent. of our rising generation, growing up with about three months hap-hazard and irregular attendance at school, is a fact which we trust will never cease to be regarded as an evil calling for the serious attention of the ablest and most practical intellects of our country.—*Toronto Mail.*

A correspondent of *The Boston Globe*, who has been visiting the kindergarten in that city, thus sums up the results of the system:

Children come out of the kindergarten, if it is conducted by those who understand the science, with a good knowledge of the relation and properties of small numbers, gained by continual counting of lines, and squares, and sticks, with an understanding of the geometrical forms—squares, oblongs, clubs, and triangles of all sorts; sticks, and slat-laying, the making of transparent forms with peas and pointed sticks, with knowledge of drawing sufficient to enable them to invent symmetrical patterns on the squared slate or paper; with much facility in little arts of manipulation that makes the little fingers dexterous; with a great many pretty songs, both devotional and picturesque; with symbolical plays taught musically, with simple, easy gymnastic exercises, and above all, with the power and habit of expressing themselves clearly and correctly. Can all this be said of the first two years, or even of the three of primary instruction? Yet it is all accomplished without books or any knowledge of reading, but simply by doing.

III. Papers on Literature and Science.

1. ON SPARE HOURS AND READING.

That was a safe and happy theme discussed by Dr. Cooper before an educational association in this city, the other day. “Spare hours” was the subject, and the worthy Dr. did it full justice, enforcing the truths advanced with characteristic pungency and raciness. Knowing the benefit to our readers of any hints how to use spare hours, and sorry that Dr. Cooper’s paper cannot be reproduced at length, we content ourselves with a number of quotations.

“Every particle of gold,” said the essayist, “is deemed valuable by the Californian miner, and is therefore worth picking up and preserving. Spare hours are to young men what particles of gold are to the miner; despise the particles and they never become rich.” Too many young persons have a dream of some El Dorado, where they shall find nuggets of gold which will make them suddenly rich, and disappointment seizes them when the vision is unrealized, and they find it is by gathering the particles that riches come.

The likeness between an uncultivated mind and an untilled farm was well enforced. “It is a big common, a barren waste, where no fence guards the ground, and no waving grain or precious fruit is to be gathered.” “An unimproved mind is a stagnant pool, breeding only what is offensive.” “It is a drag on the wheels of progress.” “It is worse than a cypher in this world of improvement.” Young men, especially, will find it worth their while to ponder these thoughts, and avoid studiously what is here deprecated.

The essayist proceeds: “Cultivation of mind is a duty which every one owes to himself, and no man can neglect the duty without, in some shape or other, paying the penalty for his misconduct.” This is a *regal* truth. And the penalty is not delayed. It is prompt in its visitation. In the same season that the field is untilled, the noisome weeds abound. So in mind; the penalty of ignorance runs close alongside the possession of ignorance. Wise men reap the rich harvest of reward almost simultaneously with sowing; ignorant men have only tares to bind.

The worthy Dr. has evidently had opportunities of carefully scrutinizing the way young men in rural sections often spend their hours, and thus is able to speak as follows: “In the country, spare hours

are often spent in visiting the neighbours' houses, lounging about the doors on a summer evening, or perhaps loafing about the tavern or the blacksmith's shop; and any little smattering of education gained at the common school is soon forgotten." There is special danger of young men thinking that when their school days are over, their education is completed. They have reached the goal of learning so far as they are concerned. Not so, however. Nothing can be more fatal to mental culture and true progress as such an idea. The school is not an end, but a means to an end. It is to help feet that have not yet learned to walk alone; but long and advancing steps remain to be taken when the school-house door has been closed upon them. True progress comes only from the use of one's whole life, not merely the early part of it.

The eulogy pronounced upon our system of education is worth a passing glance. "Without at all conveying the idea that our schools are all they might be, we have no hesitation in saying that any Canadian youth may procure the elements of a sound and profitable education." No country is more highly blessed than ours in respect of education. It is the source of perpetual admiration to strangers who visit us. The standard is high, the benefits are free, so that only will is wanted to secure these benefits and reach this standard.

A sound piece of advice is tendered about the class of books which should accompany our spare hours. "Many books are highly injurious, because they infuse a secret poison into the mind, polluting the imagination, vitiating the taste, and depraving the heart. But there are good books written by men of character and worth—fully competent to discuss the thousand topics to which they apply themselves. Let spare hours be devoted to making a good selection, and systematically reading the books of one's choice, and they will be abundantly rewarded." There is no doubt standard literature is often shelved, while pure rubbish is found in the hand and head. And the warning against the shilly-shally productions of men who write for money, not for the propagation of the good, is well-timed.

Debating societies come under the notice of the writer. He approves and disapproves of them at one and the same time. "They stimulate thought and inquiry." "All that has been ever read is again recalled, the elaborate faculty rearranges it, and so it becomes more the debater's own than it ever was before." "The memory, imagination, and judgment, are all called into activity and must be improved." But, *per contra*, "the evil arising out of such societies is the disposition to debate everything that comes up in common conversation. How can I contravene the opinion my friend has advanced? is the question which is fostered." Here the essayist treads on delicate ground. It has always been a disputed point among men of mind as to whether debating societies are expedient or judicious. Whately takes the negative promptly. But arrayed against him are Jeffrey, Macaulay, Hamilton, and many others who heroically maintain the affirmative. Undoubtedly, the greatest number of opinions advanced by great men are in their favour.

The closing pages of the essay are devoted to the discussion of the use of the leisure hours in advancing morality. The Doctor says, "It is on the cultivation of our moral faculties the safety and happiness of the community depend. Intellectual strength is really no more the test of a truly great man than is muscular power. It is moral goodness that makes the great man." There can be no doubt of this. "Beauty is strength," in morals especially. And this conclusion has been reached by several whose opinions are worth regarding, among whom none excels Tennyson in his noble lines,

"How'er it be, it seems to me
Tis truly noble to be good;
Kind hearts are more than coronets,
And simple faith than Norman blood."

The whole essay has a healthful tone and manly vigour about it, which cannot fail to commend it to those who heard it. It is refreshing to peruse it. It is like breathing good, pure, bracing air, exhilarating and stimulating in its results. And if our various associations can secure the services of such men as the essayist whose production we have been reviewing, their intellectual and moral powers cannot fail of progress and enlargement.—*London Daily Advertiser*.

LITERARY SOCIETIES.—The importance of literary societies cannot be over-estimated. They offer to the young advantages which they cannot otherwise obtain. It is well for young men to utilize the advantage thus offered, especially when a debating society is connected with a literary society. Most of the men who are now celebrated in the pulpit, and at the bar, commenced at literary and debating societies, and sometimes in a very humble way. To debate any question satisfactorily, requires careful reading, and much useful information can be obtained in that way. Many years ago, in a city not a thousand miles from Lancaster, a printer's apprentice said to the wife of his employer, Mrs. X—: "I wish I knew

what to do with my evenings." "Why," responded the lady, an educated and intelligent woman, "why, Will, don't you start a debating society?" "Oh, I couldn't he replied, "there are only two or three of the boys at the office, know anything about debating." "That is enough," said the lady, "just go on; I will help you all I can." Thus encouraged, the young man organized the society. It grew rapidly in numbers and importance. The young man read, thought, and rose gradually higher, until to-day he edits one of the "giant dailies" and is a power in the land.

If pupils could realize the influence which the participation in debates, etc., may exercise upon their life in the future, they would eagerly embrace every opportunity to discharge the duties which literary societies require of their members. Ages have elapsed since Demosthenes and Cicero lived, and yet their writings are models for all who would perfect themselves in oratory. Let young men keep these facts before their minds, and never neglect an opportunity to improve the advantages which may offer, and always consider the literary society as an important instrumentality in their mental development.—E. M'V. MOORE, in *Pennsylvania School Journal*.

2. PREPARATION IN VACATION.

The travels and recreations of vacation should not wholly shut the duties of the future out of mind. The faithful teacher will take pleasure, even in periods of rest, in gathering material for classroom use, and in devising plans for professional improvement. The opportunities of travel and visiting will furnish many facts and principles that may be used in illustration of school lessons; and all should be carefully treasured in note-books and memory. The experience of the last year has, very likely, indicated branches of study or methods of instruction in which the teacher is weak; and the cool mornings of many summer days may profitably be given to a review of these matters, and to general reading of popular science, history, travels, and other literature not remotely related to our work. Some excellent work may also be done by way of review of all common-school branches, upon the list of questions prescribed for the examination of teachers, and which are easily procurable from the County Superintendents, or in educational magazines and reports. Teachers who need nothing in review may well break ground in some new study, which shall prepare them for promotion by and by. Of course, attendance upon such professional conventions and institutes as are within reach will not be neglected.—*Michigan Teacher*.

3. THE COMET.

WHAT LEADING ASTRONOMERS SAY OF THE GREAT CELESTIAL LIGHT.

The conflicting views of leading astronomers respecting Coggia's comet will be read with interest just at this time. Professor Lyman, of Yale College, says:—

For two weeks past it has been visible to the naked eye. Now it has so increased in brilliancy that it is visible in moonlight. It is going for ten or fifteen days to increase in brilliancy. Its apparent path now is toward the sun—that is, it strikes in between us and the sun. The probability is that the tail will be quite a conspicuous object. Much depends, however, on the amount of matter in the comet as to the extent of the tail. The nucleus of the comet will probably be so near the sun that the head will be invisible—that is, that it will disappear below the north-western horizon—as it is going so near the sun. The nearest it will approach the earth will leave it about the same distance from us as Venus, when at inferior conjunction. After it disappears from the northern hemisphere it will be visible in the southern hemisphere, its motion being nearly directly south from the pole-star. As to the tail reaching us it is more than probable that we shall not perceive the visitor although, of course, no one can at the present time say whether the sweep of the tail shall touch the earth or not. Even if the tail did touch the earth the touch would likely be so diffuse as to be scarcely perceptible. The shooting stars are associated with comets, and are probably the *débris* of comets, as was especially illustrated with Biela's comet and the meteoric shower of November 27, 1872. Those showers were simply portions of Biela's comet.

Professor Newton, of Yale College, says:—
This comet, so far as he can judge, is going to travel directly south, away from the north star. It will grow in brightness for some ten days. After that the nucleus will get so near the sun as probably to be invisible in the strong twilight. It will pass almost directly between us and the sun about the 19th and 20th of July. At that time the tail, if long enough, may stretch out across our heavens, though if short too diffuse it may not be at all visible. It is fairly within the possibilities that the earth will strike through the tail, but the result would be totally inappreciable either in the

sight or in any effect on our weather. After passing the sun the comet can be seen by persons only in the southern hemisphere. It will be nearest to us about the 21st of July, being then 26,000,000 miles from us. This motion and these distances are obtained from computations made by Dr. Tietjen, of Berlin. It is possible that the observations which Dr. Tietjen was able to use were not sufficient to give an exact orbit.

Professor Swift differs widely with other astronomers who have published articles on the subject. He says there is no probability of the tail of the comet enveloping the earth or moon. The elements of this comet do not resemble those of any comet that has appeared during the last 2,000 years. Its orbit no doubt is parabolic, and it is visiting us for the first and last time. In the next two weeks more will be learned of the physical nature of comets by the spectroscope than has been learned in 4,000 years. Indications last night and to-night are of subdivisions of the tail. The comet is large, and so is the nucleus, with a disk more planetary than stellar. Should the tail increase in width as well as in length and envelope the earth we should be insensible to it, the matter composing it being so rare. The rate of motion is now thirty miles per second and directly toward us. On the 10th of July it will be nearest the sun. The tail last evening was seven or eight degrees in length, and on the side nearest the sun it had a bunchy nebulous appearance as though there was a new tail forming. Its brilliancy was a tenth greater than Wednesday evening.

Professor Eastman, of the National Observatory at Washington, says in reply to the question, "Are comets never anything but attenuated gas?"

Never anything more, so far as they have been carefully observed. Through the nucleus of the comet of 1861 I saw stars of the ninth magnitude, and the nucleus of this appears quite as transparent. Indeed, this is but a fourth class comet, at best, and its nucleus is so attenuated that if reduced to a ball of solid matter, you could probably hold it in the palm of your hand.

4. SAFETY OF LIGHTNING RODS.

The smart thunder shock of summer showers should make us think of our lightning rods. The theory of their use is, that certain atmospheric areas become surcharged with the fluid, which will avail itself of the first conductor that presents to equalize itself. If this area happens to be above a building properly protected, the fluid is conducted into the earth, on the same principle that the safety valve allows the escape of surplus steam, thus preventing an explosion. To protect a building against lightning is to offer the fluid a better protector for reaching the earth than is afforded in the building itself. The first thing is to know the weakest points in the dwelling, or those most liable to attract the fluid, and upon them to erect superior conductors. If these conductors are properly adjusted security is complete. They ought to be arranged so as to conduct electricity both ways—into as well as from the air. Perhaps the air just above the building is in a highly negative condition, at the moment when the opposite condition prevails in the earth about the foundation. This is no doubt seldom the case, but it is a condition that must be provided for to ensure proper protection. A lightning rod is made of two or three parts. The portion above the roof serves to collect the fluid, and the part below to conduct it away. Ordinarily this second part is run a few feet under ground, in which case it is not only useless, but absolutely dangerous. Unless this part terminates in water, or is connected with something of great dispersive capacity, the rod will utterly fail. In houses having gas pipes, a reliable protection will be given by erecting the gathering rods above the roof and connecting them with the pipes in the interior, which form ready conductors, leading eventually into the ground, where the connection with the mains ensures a complete and safe distribution. But in cases where it is found necessary to run the conductor to the ground, it should terminate in a well or some other body of water. If the well is not convenient for the purpose, then a hole should be bored from ten to fifteen feet in depth, and the rod extended into it and packed with freshly-heated charcoal. If these conditions are not observed, the erection of a rod only adds to the danger of being struck with lightning. The material of the conductors is of less consequence than their arrangement. The upper end should be pointed with a platinum needle, and should not be less than one inch in diameter if ten feet above the roof, or two inches if it rise to twenty or thirty feet. The rod below the roof may be made of plain iron, iron rope, copper strap, galvanized iron, or other material. Galvanized iron is probably the best. Sharp turns in running down the building should be avoided, also propinquity to other conducting materials forming part of the building. The more surface there is to the rod the better, because it is on the surface that the fluid passes. All these things being well attended to, no danger need be apprehended.—*London Free Press.*

5. POPULATION OF THE GLOBE.

In an elaborate paper by Behm & Wagner, published in Petermann's *Mittheilungen*, we have the result of a careful inquiry into the present population of the globe, the summation of their result being as follows: Europe, 301,600,000; Asia, 794,000,000; Australia, and Polynesia, 4,365,000; Africa, 192,520,000; America, 84,524,000; or a total of 1,377,000,000. These figures are derived from the estimates or statistics of population for the years 1869, 1870 and 1871. In the enumeration of the population of towns, London stands at the head, with 3,251,000; next Sutchoo, in China, 2,000,000; Paris, 1,835,000; Peking, 1,684,000; Jedo, 1,554,000; Canton, 1,236,000; Constantinople, 1,075,000; Siang-tau, China, 1,000,000; Tchang-tehoufoo, China, 1,000,000; New York, 942,292; Vienna, 833,855; Berlin, 825,389.

The religious distinctions recorded in the Indian Census, are among the most interesting statistical facts. Unfortunately, the returns are still imperfect, Madras, Bombay, and Scinde, being as yet unascertained. Of those whose creeds are enumerated we find Christians, 107,000; Mahomedans, 35,963,000; Hindoos, 97,351,000; Buddhists and Jains, 2,319,151; and "others," 9,135,000.

The Island of Ceylon showed a population of 2,405,287; Singapore had 97,000 inhabitants; Penang, 67,000; Province of Wellesley, 71,900; and Malacca, so recently raised to polemical importance, 77,000. The Island of Hong Kong and the Peninsula of Kow-loon, have an aggregate population of 120,000.

We have thus completed the circuit of the Empire. The result of the survey is briefly summed up in the report, and the figures, concise and few, are pregnant with interest. "The Empire possesses 7,768,449 square miles of territory. The United Kingdom 121,608 square miles; the Colonies, 6,685,021; India and Ceylon, 962,820. There are 38 persons to the square mile in the Empire; 260 in the United Kingdom, 210 in India, and 141 in the Colonies." It should be observed, however, that in some parts of India the density of population more than equals that of England. The Queen rules over 234,762,593 souls; her people dwell in 44,142,651 houses; the area of the lands they inhabit is not less than 7,769,449 square miles. Never has the census of an Empire so splendid in existence and so imposing in prospect been recorded.

Prof. Tyndall, in a recent lecture on gases, said that a German chemist lately told him that he had submitted hydrogen gas to a pressure of 8,000 atmospheres or 125,000 lbs. per square inch, and, although the iron piston-rod of the apparatus used was actually shortened by the tremendous pressure, the gas showed no signs of liquefaction.

The varying elastic force of vapours may be nicely shown by the following experiment. Take five barometer tubes; fill with mercury in the ordinary way and invert over a cistern of that metal. The mercury will stand at about the same height in all. Let No. 1 which has in the vacuum at the top only mercurial vapour remain to mark the height of the barometric column and, as well, the pressure of mercurial vapour. Introduce into No. 2 a drop of water; into No. 3 a drop of alcohol; into No. 4 a drop of carbon bisulphide; into No. 5 a drop of ether. The mercury will be depressed in each tube by the vapour formed from the evaporation of the liquids introduced and will stand the lowest in No. 5 as ether is the most volatile of them all.

6. WHAT MAKES THE SKY BLUE.

The ethereal blue colour of the sky is due to minute particles of matter which float in the air. Were these particles removed the appearance of the sky would be dead black. It is a fact in optics that exceedingly fine portions of matter disperse or scatter the blue rays of light, coarser portions scatter red rays, still coarser portions scatter all the rays, making white light. The atmosphere is full of aqueous vapour, the particles of which diffuse white light in all directions. When the particles are enlarged, they become visible in the form of clouds. The vapour particles of the white clouds are supposed to be finer and lighter than those of the dark clouds. That the diffusion of light in our atmosphere, the blue colouring of the sky and the colours of the clouds, are due to the presence of matter floating in the air, has been conclusively proven by Tyndall. On passing a beam of sunlight through a glass tube, the beam is rendered brilliantly visible by the reflection of light from the dust particles floating in the air contained in the tube. But on removing the dust particles, which is done by filtering the air by cotton wool, or causing the air to pass over a flame, the beam of light is no longer visible in the tube.—*Scientific American.*

IV. Monthly Report on Meteorology of the Province of Ontario.

ABSTRACT OF MONTHLY METEOROLOGICAL RESULTS, compiled from the Returns of the daily observations at ten High School Stations, for MAY, 1874.

OBSERVERS:—Pembroke—R. G. Scott, Esq., M.A.; Cornwall—James Smith, Esq., A.M.; Barrie—H. B. Spotton, Esq., M.A.; Peterborough—J. B. Dixon, Esq., M.A.; Belleville—A. Burdon, Esq.; Goderich—Hugh J. Strang, Esq., B.A.; Stratford—C. J. Macgregor, Esq., M.A.; Hamilton—George Dickson, Esq., M.A.; Simcoe—Dion C. Sullivan, Esq., LL.B.; Windsor—J. Johnston, Esq., B.A.

Table with columns: STATION, BAROMETER AT TEMPERATURE OF 32° FAHRENHEIT, MONTHLY MEANS, RANGE, MONTHLY MEANS, DAILY RANGE, HIGHEST, LOWEST, WARMEST DAY, COLDEST DAY, TENSION OF VAPOUR.

Approximation. dOn Lake Simcoe. eNear Lake Ontario on Bay of Quinte. fOn St. Lawrence. gOn Lake Huron. hOn Lake Ontario. iOn the Ottawa River. jClose to Lake Erie. mOn the Detroit River. nInland Towns.

Table with columns: STATION, HUMIDITY OF AIR, WINDS, NUMBER OF OBSERVATIONS, ESTIMATED VELOCITY OF WIND, AMOUNT OF CLOUDINESS, RAIN, SNOW, AURORAS.

REMARKS.
a Where the clouds have contrary motions, the higher current is entered here.
b Velocity is estimated, 0 denoting calm or light air; 10 denoting very heavy hurricane.
Pembroke.—Lightning 30th. Lightning thunder, and rain 9th. Frost 4th, 5th, 6th. Snow 1st, 7th. Rain 9th, 13th, 15th, 16th, 20th, 21st, 24th, 25th, 26th.
Cornwall.—Solar halo 4th. Lightning and rain 13th. Lightning, thunder and rain 9th and 10th. Wind storm 8th. Snow 1st, 2nd, 6th. Rain 8th, 9th, 10th, 14th, 18th, 22nd, 25th, 28th, 31st. Canary 6th.

STRATFORD.—Thunder with rain 20th. Lightning and thunder with rain 12th, 24th, 25th, Frost 1st, 2nd, 3rd, 7th, 9th. Wind storms 9th, 25th. Rain 12th, 15th, 16th, 17th, 20th, 24th, 25th, 26th, 31st. Excess of temperature over average of May thirteen years + 1°17'.
 HAMILTON.—Lightning 12th. Lightning and thunder with rain 20th, 31st. Frost 9th. Rain 12th, 16th, 20th, 31st.
 SIMCOE.—Rain 12th, 16th, 17th, 18th, 20th, 25th, 31st. No observations here on 1st and 2nd owing to removal of instruments.
 WINDSOR.—Lightning 12th, 28th. Hail 17th. Lightning with thunder 24th. Lightning and thunder with rain 29th. Meteor in E. towards H. and one in N. towards H., 10th. Meteor through *Draco* and *Polaris* towards H. at N.W. on 12th. Solar and Lunar halo 22nd. Solar halo 23rd and 24th. Frost 1st, 3rd, 7th, 19th. Wind storms 2nd, 25th. Rain 4th, 15th, 17th, 19th, 20th, 29th.

V. Mathematical Department.

To the Editor of the Journal of Education.

Toronto, 22nd June, 1874.

SIR,—I herewith send you solutions of the questions in Algebra and Natural Philosophy, which were proposed to candidates for First Class Certificates at the recent examination of the students of the Normal School.

I may state that Mr. Birchard, to whom a First Class Certificate of the highest grade was awarded, solved correctly all the questions in Natural Philosophy; and, instead of writing out solutions of my own, I send you those which he gave. I asked him to re-write his paper, making no material change, but only extending abbreviations, and (as I wished to dispense with diagrams) making such statements, not necessary where the diagram was exhibited, as might render his work intelligible in the absence of the diagram. The paper will be felt, I think, to be a creditable production.

The solutions of the questions in Algebra have also been prepared by Mr. Birchard, though these solutions do not exhibit his work done in the hall.

As I understand that the solutions of the first-class questions in Algebra and Natural Philosophy, which appear from time to time in the *Journal*, are extensively studied, I have, in order to prevent misapprehension, added a note on the first question in the Natural Philosophy paper of July, 1873.

I am, Sir,
 Your obedient servant,
 GEORGE PAXTON YOUNG.

NORMAL SCHOOL EXAMINATION, JUNE, 1874.

Solution of First Class Questions in Algebra and Natural Philosophy.

ALGEBRA.

1. (a) Substitute vy for x ; then

$$v^2y^2 + 6vy^2 + 27 = 0, \text{ or, } y^2 = -\frac{27}{v^2 + 6v}$$

$$y^2 - 2vy^2 - 16 = 0,$$

$$\text{or, } y^2 = \frac{16}{1 - 2v}$$

$$\frac{-27}{v^2 + 6v} = \frac{16}{1 - 2v}. \text{ Therefore, \&c.}$$

(b) $\sqrt{3x^2 + x - 1} = 9x^2 + 3x - 5$; re-arrange this, then

$$3(3x^2 + x - 1) - \sqrt{3x^2 + x - 1} = 2; \text{ this gives}$$

$$\sqrt{3x^2 + x - 1} = -\frac{2}{3} \text{ or } 1. \text{ Therefore, \&c.}$$

(c) $x^4 + 2x^3 + 2x^2 + 2x + 1 = 0$.

$$x^2 + 2x + 2 + \frac{2}{x} + \frac{1}{x^2} = 0.$$

$$\left(x^2 + 2 + \frac{1}{x^2}\right) + 2\left(x + \frac{1}{x}\right) = 0.$$

$$\left(x + \frac{1}{x}\right)\left(x + \frac{1}{x} + 2\right) = 0.$$

$$x + \frac{1}{x} = 0 \text{ and } x + \frac{1}{x} + 2 = 0.$$

$$x = \pm \sqrt{-1} \text{ or } x = -1,$$

hence the values of x are $\pm \sqrt{-1}$, -1 and -1 .

It will be observed that two of the roots are equal.

[Instead of using the general method for solving a recurring equation, it would have been simpler, in this particular case, to have proceeded as follows:

$$x^4 + 2x^3 + 2x^2 + 2x + 1 = (x^4 + 2x^3 + x^2) + (x^2 + 2x + 1) = (x^2 + 2x + 1)(x^2 + 1).$$

Therefore the roots of the given equation are the roots of the equations,

$$x^2 + 2x + 1 = 0$$

$$\text{and, } x^2 + 1 = 0.$$

G. P. Y.]

2. Let x = number of minute spaces passed over by the hour hand after 7 o'clock. Then $12x$ = spaces passed over by minute hand; and since the minute hand is only two minutes behind the hour hand, we have $x + 35 - 2 = 12x$, or, $x = 3$; and hence the time is 7h. 36m.

Now, in order to give 11 spaces, the minute hand must pass over 12 spaces; and to find the true time it takes to do this state thus, $719 : 12 :: 720 : 12\frac{1}{11}$. \therefore the true time is $36 + 12\frac{1}{11} = 48\frac{1}{11}$ minutes after 7 o'clock.

3. Let x and y be the extremes, then $\frac{2xy}{x+y}$ is the mean.

$$\therefore x^2 + \left(\frac{2xy}{x+y}\right) + 2y^2 = 7 \quad (1)$$

$$x \times \frac{2xy}{x+y} \times y = \frac{x+y}{2} \quad (2)$$

Simplifying (2), we get $2xy = x+y$ (3)
 Thus equation (1) becomes $x^2 + 1 + y^2 = 7$ (4)

Squaring (3) and subtracting (4), we get $4x^2y^2 - 2xy = 6$, or $xy = \frac{3}{2}$ or -1 ; it is now easy to get the values of x and y which give the following series: $\frac{1}{2}(3 + \sqrt{3})$, $\frac{1}{2}(3 - \sqrt{3})$, or $-1 + \sqrt{2}$, 1 , $-1 - \sqrt{2}$.

4. $\begin{cases} (m+1)^2 + a(m+1) + b = 0 \\ (m-1)^2 + a(m-1) + b = 0 \end{cases}$

Hence $m+1$ and $m-1$ must be the roots of the equation, $y^2 + ay + b = 0$; but the roots of this equation are $\frac{1}{2}(-a + \sqrt{a^2 - 4b})$ and $\frac{1}{2}(-a - \sqrt{a^2 - 4b})$; and the roots of the given equation, $x^2 + 2ax + 4b = 0$, are $-a + \sqrt{a^2 - 4b}$ and $-a - \sqrt{a^2 - 4b}$ which are just twice the former roots; but the roots of the former equation were $m+1$ and $m-1$, therefore the roots of the latter are $2(m+1)$ and $2(m-1)$.

[Would it not have been more direct to have reasoned as follows:

Put the equation, $x^2 + 2ax + 4b = 0$, in the form $\left(\frac{x}{2}\right)^2 + a\left(\frac{x}{2}\right) + b = 0$. Then, by the given conditions, $m+1$ and $m-1$ satisfy this equation; that is, the two values of $\frac{x}{2}$ are $m+1$ and $m-1$; therefore the two values of x are $2(m+1)$ and $2(m-1)$.

G. P. Y.]

5. Let the roots of the equation $x^2 + px + q = 0$ be a and b ; then $a+b = -p$, and $ab = q$.

Also, from the question, $a^3 + b^3 = 4(a+b)^3$;
 or, $(a+b)(a^2 - ab + b^2) = 4(a+b)^3$
 Substituting the values of $a+b$ and ab ; we get $-p(p^2 - 3q) = -4p^3$; transposing and reducing, we get $3p(p^2 + q) = 0$; hence either p or $p^2 + q = 0$.

[Otherwise thus:

$$4(a+b)^3 = a^3 + b^3 = (a+b)^3 - 3ab(a+b).$$

$$\therefore -4p^3 = -p^3 + 3pq$$

$$\therefore 3p(p^2 + q) = 0. \text{ Therefore, \&c.}$$

G. P. Y.]

6. Let a and b be the roots of the equation, $x^2 + mx + n = 0$; and A and B the roots of $x^2 + Mx + N = 0$. Then $(a-b) = \sqrt{(m^2 - 4n)} = d$; and $A - B = \sqrt{(M^2 - 4N)} = D$.

$$\text{Then } \frac{d^2}{D^2} = \frac{m^2 - 4n}{M^2 - 4N} = \frac{n}{N} \text{ by question.}$$

Now, since the numerator and denominator $\frac{m^2 - 4n}{M^2 - 4N}$ are of

$$\frac{4n}{4N} = \frac{d^2}{D^2} \text{ therefore also } \frac{m^2}{M^2} = \frac{d^2}{D^2} \text{ hence } \frac{m}{M} = \frac{d}{D}.$$

7. Let x = speed of the train from A in miles per hour; and y = speed of the train from B in miles per hour.

$$\frac{12}{x} - \frac{10\frac{1}{2}}{y} = \text{time before second train starts,}$$

$$x = 60$$

$$\text{then } \frac{24}{x} + \frac{34\frac{3}{4}}{60} = \frac{24}{y} + \frac{12}{x} - \frac{10\frac{1}{4}}{60};$$

$$\text{and } \frac{24}{x} + \frac{34\frac{3}{4}}{60} + \frac{10\frac{1}{4}}{x+y} = 2 - \frac{10\frac{1}{4}}{60};$$

The first equation is obtained by equating the time which elapsed before the second train reached C; the second by equating the time before the collision. Reducing the equations we get $\frac{4}{x} - \frac{8}{y} + \frac{1}{4} = 0$, and $-\frac{8}{x} + \frac{1}{x+y} = -\frac{17}{32}$

let $x=vy$; and we get $\frac{32}{17} \left(\frac{3v+8}{v^2+v} \right) = \frac{32v-16}{v}$; from which $v=1$; hence $x=y=16$. Hence the rates were each 16 miles per hour.

8. Let x and y be the commissions on \$100.00.

$$\frac{100-x}{1+\frac{y}{100}} = \frac{100(x+y)}{100+y} = \text{commission received for each } \$100 \text{ received for the flour.}$$

Similarly, $\frac{100(y+x)}{100+x} = \text{com. on the second supposition,}$

hence, we get the equations $\frac{100(x+y)}{100+y} = 4 \frac{46}{51} = \frac{250}{51}$.

$$\frac{100(y+x)}{100+x} = 4 \frac{88}{103} = \frac{500}{103}$$

Dividing the first equation by the second, we get $\frac{100+x}{100+y} = \frac{103}{102} = \frac{100+3}{100+2}$; hence $x=3$, and $y=2$.

2. NATURAL PHILOSOPHY.

1. Book work.

2. [In the printing of this question, a word is omitted. Instead of EA, EC, ED, read EA, EB, EC, ED.—G. P. Y.]

Let E be the point on the square, ABCD; through E draw FG, HK parallel to the sides of the square; the point F being in AB, and H in AD. Then, the force EA, may be replaced by the forces EH and EF; the force $\frac{1}{2}$ EB, by the forces $\frac{1}{2}$ EF and $\frac{1}{2}$ EK; the force $\frac{1}{2}$ EC by $\frac{1}{2}$ EK and $\frac{1}{2}$ EG; and the force $\frac{1}{2}$ ED by $\frac{1}{2}$ EH and $\frac{1}{2}$ EG. Adding like terms, we get $\frac{5}{2}$ EH, $\frac{3}{2}$ EF, $\frac{3}{2}$ EK, and $\frac{7}{2}$ EG. Now, EH is two ft., therefore, EK is three; EF is $1\frac{1}{2}$, therefore, EG is $3\frac{3}{2}$, and $\frac{5}{4} \times 2 = 2\frac{1}{2}$; $\frac{3}{5} \times 3 = 2\frac{1}{5}$; $\frac{3}{2} \times \frac{7}{5} = 2\frac{1}{10}$; $\frac{7}{12} \times \frac{1}{5} = 2\frac{1}{10}$; hence we see the opposite forces exactly balance each other; the particle will therefore remain at rest.

3. Let friction at C be F; friction at A, S; reaction at C, P; reaction at A, R. Then, P and S are the only forces producing any result in a horizontal direction; and since the beam is in equilibrium, P is equal to S; take moments around A; and let AB, BC each equal a ; then, $P \times a + F \times a = W \times \frac{1}{2}a$; or, $P + F = \frac{1}{2}W$. But $P=S$. $\therefore S + F = \frac{1}{2}W$; and S and F are the frictions on the plane and wall respectively; and W is the weight; therefore, the sum of the two frictions is one-half the weight.

4. Resolving gravity parallel to the plane and at right angles to it, we get equal $\frac{W}{2}$ equal to the friction acting up the plane. Now to draw the body up the plane, we must overcome both friction, which now acts down the plane, and gravity resolved parallel to the plane, each of which has been shown to be $\frac{W}{2}$; hence, the force necessary to draw the body up must be equal to the weight.

5. Let g be the measure of gravity in feet per second; at the end of n seconds the velocity will be ng ; and during the next n seconds this velocity will carry it through $ng \times n = n^2g$ ft; but during the same time, gravity will carry it through $\frac{1}{2}n^2g$; hence, the whole space is $\frac{3}{2}n^2g$, which is three times $\frac{1}{2}n^2g$, the space passed over by the second body in n seconds.

6. Since the forces denoted by the weights P and Q, are opposite to each other, the resultant is $P-Q$; this has to move a weight of $P+Q$; hence, the velocity generated in one second is $\frac{P-Q}{P+Q}g$, and the space passed over in n seconds is $\frac{1}{2} \left(\frac{P-Q}{P+Q} \right) gn^2$. Now, suppose the rope to be cut; P will continue to rise during $\frac{(P-Q)n}{P+Q}$

seconds, and will pass over a space of $\frac{1}{2}g \left\{ \frac{(P-Q)n}{P+Q} \right\}^2$ feet.

Therefore, as the space before the string is cut : the space after the string is cut : : $\frac{1}{2} \left(\frac{P-Q}{P+Q} \right) gn^2$: $\frac{1}{2}g \left\{ \frac{(P-Q)n}{P+Q} \right\}^2$. Reducing this ratio, we get $P+Q : P-Q$.

7. Let t be the time before they meet; $\frac{1}{2}gt^2 =$ space fallen by the particle from B; and $50t - \frac{1}{2}gt^2 =$ space the particle from A rises. Then, $\frac{1}{2}gt^2 + (50t - \frac{1}{2}gt^2) = 100$; or, $t = 2$ seconds. Hence, $\frac{1}{2}gt^2 = 64 =$ distance of point of collision from B. Now, as the distance of the centre of gravity from B is to distance from A, so is the weight of A (16) to weight of B (9). This divides the whole space 100 ft., into 64 and 36, which is the same as we found in the previous case. Hence, the point of collision coincides with the centre of gravity of the particles.

8. The area of the surface pressed, together with the area of the surface of the liquid, is 5 sq. ft.; this multiplied by the height of the centre of gravity of the liquid, and again by the weight of a cub. ft. of the liquid, gives the pressure. Therefore, $5 \times \frac{3}{8} \times 1000 = 1875 =$ pressure due to the water. The air will press the same as if no water was present. Hence, $144 \times 6 \times 15 \times 16 \times \frac{1}{144} = 1440 =$ pressure due to the confined air; \therefore whole pressure = $1875 + 1440 = 3315$ oz.

9. [In the printing of this question, insert the word "feet" after $3s - \frac{5}{6}$. Also, S is the same as s .—G. P. Y.]

Let x be the specific gravity of the lower cylinder; the point c , the centre of gravity of the whole cylinder; D, the surface of the water; DB the part submerged; and v the volume of each part of cylinder. Thus:

$$vs + vx = \text{weight of cylinder.}$$

$$2v = \text{of equal volume of water.}$$

$$\frac{v(s+x)}{2v} = \text{fraction of cylinder submerged.}$$

$$\frac{v(s+x)}{2v} \text{ of } 2 = \text{ft. submerged} = s + x.$$

Next, let $y =$ distance of c from the lower end of the cylinder; and take moments around c . Then,

$$x(y - \frac{1}{2}) = s(\frac{3}{2} - y); \text{ or, } y = \frac{x+3s}{2(s+x)}.$$

BD - BC = depth of centre of gravity below the surface of the water = $s+x - \frac{x+3s}{2(s+x)}$ and this = $3s - \frac{5}{6}$ by the question. Hence,

$$s+x - \frac{x+3s}{2(s+x)} = 3s - \frac{5}{6}.$$

Solving this equation we get $x=2s$, which is the specific gravity of the lower cylinder.

[There is, of course, a second solution of the equation, but it would make x negative, and is, therefore, inadmissible.—G. P. Y.]

Note on Question 1, in the Nat. Philosophy Paper of July, 1873.

In this question, the side of the cube must be supposed to be given. In the solution, by Mr. Cockrane, which appeared in the Journal for October, 1873, the side was assumed to be 1 foot. Any other length might be taken, but then, the result would be different.—G. P. Y.

VI. Educational Intelligence.

OTTAWA COLLEGIATE INSTITUTE.—The ceremony of laying the corner stone of the new building for the Collegiate Institute, was performed Thursday, 4th ult., by His Excellency, the Governor-General, in the presence of a large concourse of people, as well as the pupils of the Institute and several other educational establishments in the city. The new building is situated in the corner of Cartier Park, near the Canal, and will be sufficiently retired for educational purposes. The following address was presented to Lord Dufferin by the Board of Trustees:

TO HIS EXCELLENCY EARL DUFFERIN.

May it please Your Excellency:

The Board of Trustees of the Collegiate Institute of the City of Ottawa, aware of the great interest that Your Excellency takes in all matters that tend to the welfare of Canada and especially of educational institutions, having respectfully prayed Your Excellency to lay the foundation stone of this building, which, when completed, will be devoted to the purpose of teaching the higher branches of a classical, scientific, and English education, and Your Excellency having graciously consented to

comply with its prayer, now expresses to Your Excellency its sincere satisfaction for the encouragement Your Excellency this day gives to its endeavours to establish in Ottawa a Collegiate Institute worthy of the Capital of the Dominion.

The Board wishes further to convey to Your Excellency its constant desires for the welfare of Your Excellency and the Countess of Dufferin, and its hope that Canada under the fostering care of Your Excellency, as the representative of its Gracious Sovereign, will advance in intellectual culture, as it has heretofore advanced in material prosperity.

JOHN P. FEATHERSTON,
Chairman.

Ottawa, June 4, 1874.

His Worship the Mayor also read the following *resume* of the history of the Institute :

The Ottawa Collegiate Institute, formerly known as the Grammar School, was established in the year 1843, at the time when the Bathurst District was divided, and the Eastern Division became the Dalhousie District, now the County of Carleton. The Rev. Thomas Wardrobe, afterwards Pastor of Knox Church, Daly Street, now of Guelph, was the first Head Master. He received his appointment from the then Governor of the Province, Sir Charles Metcalfe. The first Board of Trustees consisted of the Rev. Dr. Strong, Rev. J. Cruickshank, Rev. Father Phelin, Messrs. J. B. Lyon Fellowes, and Joseph Coombs. The Rev. Mr. Wardrobe held office for two years, when he resigned, and was succeeded by the late Rev. John Robb, whose tenure of office extended from 1845 to 1850. Mr. William A. Ross, of the firm of Scott, Ross & Stewart, of this city, was the next head master, and held the appointment from 1850 to 1856. Mr. Miller, M.A., of Trinity College, Dublin, followed from 1856 to 1858; the Rev. A. J. Borthwick, M.A., now Public School Inspector of this city, from 1858 to 1862. The present head master, Mr. J. Thorburn, M.A., received his appointment in 1862. The first house leased as a school building for the grammar school, was that occupied by Mr. Patterson, east side of Ottawa Street, between Daly and Stewart Streets. The school was next removed to a house on the same site as that now occupied by the store of Mr. Jas. Hope, corner of Sparks and Elgin streets. It was next moved to a building on the corner of Elgin and Albert streets, the present site of Dufferin Terrace. Again it was moved to Cook's building, south side of Queen street. The building at present occupied by the Institute on Queen street, City Hall Square, was leased in 1862. This institution, as will be seen from the above statement, has hitherto been leading a somewhat nomadic life, without any local habitation, moving from one building to another, as circumstances necessitated. It is therefore a matter deserving of special thankfulness, that this unsatisfactory state of affairs will soon be obviated by the erection of a suitable and commodious building, which will be an ornament to the city. By a recent Act of the Provincial Legislature the grammar schools were remodelled and received the designation of High schools, and by a clause of that Act it is provided that, to encourage the establishment of superior classical schools, it shall be lawful for the Lieut.-Governor in Council to confer on any high school in which not less than four masters are fully engaged in teaching the subjects of the prescribed curriculum, and in which the daily average of male pupils studying the Greek or Latin language shall not be less than sixty, the name of Collegiate Institute. In terms of this provision the Ottawa High School received the status of Collegiate Institute in November, 1872. The Trustees of the Collegiate Institute Board for the current year are : J. P. Featherston, Chairman; E. McGillivray, Geo. Hay, Rev. D. M. Gordon, B.D., Jas. Warnock, Wm. Pennock, Francis Clemow, A. Rowe, John Pennock, Secretary-Treasurer. M. Nile, Messenger. STAFF OF TEACHERS.—J. Thorburn, M.A., Head Master; J. McMillan, B.A., Assistant Classical and Science Master; Rev. T. D. Phillips, M.A., Mathematical Master; Thos. Hislop, Graduate of Normal School, Toronto, English Master; Mons. Ami, French Master.

The stone, which is a massive block of angular shape, so as to fit the corner of the building and rest on both walls, will have a marble slab let in with the following inscription: "Architect, W. T. Thomas, Superintending Architect, W. Chesterton; Contractor, George Crain; Trustees J. P. Featherston, F. Clemow, E. McGillivray, G. Hay, Rev. D. M. Gordon, W. Pennock, J. Warnock, A. Rowe. This stone was laid by His Excellency, Lord Dufferin, June 4, 1874." In the cavity of the stone were deposited the record, coins, and newspapers published below: The following coin, all of late dates, were put in a leaden casket: 1 50 cent silver piece; 1 25 cent do; 1 10 cent do; 1 5 cent do; 1 1 cent. The following are the names of the newspapers sacrificed to the ceremony. *Ottawa Free Press, Times, Daily News, Courier D'Outouais, Citizen; Toronto Globe and Mail; Montreal Herald and Gazette, Grip.* The site for the building was selected by the Board, and purchased at a cost of \$3,000. The designs, drawings, &c., were prepared by W. T. Thomas, of Montreal, Architect. The style of the building is gothic, and simple in character. The main body of the masonry is to be faced stone from the quarry of Mr. Robert Skead, the projecting portions of the window dressings to be limestone. The oriel windows and labels to be of Berea stone from Ohio. The whole of the basement is to be used as a play room, and to have entrances on either side. On the ground floor will be two large charcoal rooms, library, apparatus rooms, and small rooms for the use of the teachers. The first floor will be divided into study and class rooms, and the attic to be formed into one large lecture room. The principal entrance will be on Lisgar street, and a smaller one on the side next to Cartier Square, for the use of the teachers. The total cost, exclusive of the heating, amounts to \$25,594. Mr. George Crain has taken the

contract for the erection of the entire building, and Mr. Walter Chesterton is the architect superintending.

The following address was presented on behalf of the students, by Master Geo. M. Greene, to His Excellency.

PACE TUA, ILLUSTRISSIME.

Nos, discipuli Ottawaensis Academicæ Scholæ, animis libentissimis et maxima voluntate salutem ubi dicimus.

Per gratum nobis fecisti, quod, a cura tua regni et altis laboribus cessans ad hoc festum solenne nostrum venisti, ut primum lapidem hujus academicæ aedificii pro doctrina et educatione juvenum instituti ponas.

In rem tuam erat ut, in juvenilibus annis more majore tuorum, animus tuus insigni fonte artium literarum que aleretur et postea, annis volventibus, ductus delectatione tam audiendi quam videndi novas res in altis regionibus septentrionum, onustus tuorum itinerum ad multas externas natione opinis fructibus domum incolumis redires.

Iste preclarus cultus artis literarumque, qui vitam tuam adornat, nos certiores facit ut quæ studia ad humanitatem et bonos mores pertinent, quæ in majus triumphos scientiæ provehant, et itaque adjumenta generandi vitæ opera dant, ea benigne æstimos.

Hæc schola permultos annos artes preceptaque morum doceat, lumina scientiæ et literarum diffundat, et fons sempiternus inviolatæ fidei veritatisque natis postmodo multis sit.

Ne te diutius sermone nostro detineamus, oramus ut amico et benigno animo hæc dicta accipias, et magna multaue bona tibi et conjugii tuæ pulchrae praeclaraque precamur.

Valeatis tuque tuique
Nunc dicendum est.

His Excellency, in reply, read the following:—

Alumni, Ottawaensis Academicæ Scholæ:—

Dies notandos mihi candidissimis calendis istos semper puto in quibus vitam dare, et amico vultu aspicere in instituta disciplinæ litterisque dedita mihi occurrat.

Viatore nunc estis per semitas æduas angustiasque, ut mature in jucundissima lataque scientiæ prata veniat.

Labores, crede mihi, me cognoscente, magno præmio compensati erunt præmia potestatis scire, hoc est potestatem habere.

Hoc saxo quadrato posito, tam certa sedes ad prætarum aedificium spectantes, struendum mementote Ciceronis vere bonum—"Senectus fundamentis adolescentiæ constituta est."

Restat ut vobis gratias referam propter amica verba erga meipsum conjugemque: Vobis vestrisque multam salutem dico, multos annos famæ notissimos prædico.

Master Bradley, a boy of eleven years of age read the following address with remarkable clearness and propriety:—

May it please Your Excellency:

Having been invited by the Directors of the Collegiate Institute of which you have just laid the foundation stone, to be present on this occasion, it was thought that Your Excellency would not be displeased if we ventured to present you with a short address, and accordingly 45 boys and 31 girls tried their hands at it. Out of these 76 attempts the following remarks have been selected, and the address therefore embodies just what the pupils of the Public Schools themselves thought to say to Your Excellency. In the first place we desire to thank Your Excellency for the great interest you take in the education of the young, and we remember with gratitude the good advice you gave us at our Annual Exhibition, last Christmas, when Your Excellency and the Countess of Dufferin were so kind as to honour the meeting with your presence. As a proof that Your Excellency's instructions were attentively received, it may not be improper to say that in about forty of the seventy-six drafts out of which this address is made, that speech was referred to as a cause of great encouragement. We have tried to follow your good counsel, and many of us are now looking forward to the time when we shall be sufficiently advanced in our studies to enter in the Collegiate Institute. It is our hope that like the Public Schools, it will be free to all the children who may be qualified to enter it, and if it shall be so, it cannot fail to be of the greatest advantage to Ottawa and the country generally.

We desire to say that we value our great privileges, and that we hope to prove our gratitude by cherishing a loyal attachment to our noble Queen, whom we have all so much reason to reverence and love.

As Your Excellency is the first Governor-General, so far as we know, who has honoured the Public Schools by his countenance, we desire to thank you for having set the example, and we beg to assure Your Excellency that we shall esteem it a very great honour if you should again countenance our anniversaries. These are only a few of the remarks contained in the papers submitted by the scholars, but they are those most frequently repeated, and as such are offered to Your Excellency with sincere good wishes for your health and happiness, and for the health and happiness of Her Ladyship the Countess of Dufferin, whose goodness in accompanying Your Excellency at our Christmas meeting, and her nice pleasant looks while there, we shall never forget.

His Excellency very kindly inquired the boy's name, and then said: Master Bradley, I beg to thank you for the admirable address that you have presented me with, from your schoolfellows, both girls and boys, and I must say that they have done very wisely in choosing you, who can read with such propriety and with such feeling, and with a diction so pure and classical; and the school which you represent could not have devised a better method of convincing those who stand around me of the admirable way of the conduct of that institution. Such a satisfactory specimen of your efforts is the best proof of the excellence of your train-

ing. You will have the kindness to return on my behalf, to your school-fellows, my best thanks; and I can assure you that Lady Dufferin will very much appreciate the very gallant expressions in which you have been kind enough to allude to Her Excellency. (Applause.)

His Excellency further said:—Mr. Mayor, Ladies and Gentlemen, I have already on so many previous occasions had the opportunity of expressing to the public of Canada the deep interest I take in all these institutions, and the confirmed conviction that I entertain that there is nothing more calculated to promote the prosperity of the country than establishments of this kind, founded on pure and sound principles, that it will be unnecessary for me to repeat those observations, or to give you any fresh assurance of my sentiments in this regard, but I do not wish to let this opportunity pass without expressing my supreme satisfaction for the very satisfactory account with which I have been favoured. Of the circumstances which have led to the foundation of this institution—of the prosperous condition in which it is at its commencement, and of the promising future which lies before it. And I can assure you that so soon as the object which you have in view is in progress—when the walls of this hall are raised, I shall consider it one of my chief privileges to come and visit the school, (Cheers.) I may also be forgiven if I take this opportunity of expressing the personal gratification I feel in congratulating those who are interested in the success of this institution upon its possession in the Head Master, of a person so admirably qualified to secure the prosperity of the school and conduct it on proper principles. He was one of the first persons with whom I became acquainted on arriving in Ottawa, and I must say that I esteem it as a great privilege that I should have had opportunities of maintaining my intercourse with him, and conversing on many classical subjects. I also have the pleasure of knowing one of his assistants, whom I am perfectly justified in considering a great acquisition to the teaching staff of the College. I trust that in future years it may be my good fortune to extend my acquaintance to the other gentlemen who assist him. I may also be permitted to say that it is my intention to give a silver and a bronze medal to be annually competed for by the pupils on conditions that can be settled between the Head Master and myself. I need only say further that it must be a source of pride and gratification to every inhabitant of Canada to know that there are institutions of this kind, founded on such principles, and administered with such sound judgment, established on such satisfactory conditions in almost every city and centre in the Dominion. It affords the strongest evidence that for the future the young of Canada will have the means of obtaining an education and the development of their natural intelligence, and which will also inculcate the principles of virtue and morality as well as literary wisdom, by which the civilization of the world is maintained.

A silver trowel was then presented to His Excellency, and the corner stone having been lowered to its bed of mortar, he declared it duly laid. The Rev. D. M. Gordon then offered prayer for the prosperity of the institute, and the protection of those engaged in the work, and the ceremony was brought to a close after three hearty cheers, called for by the Mayor, had been given for the Queen, and three for His Excellency and the Countess of Dufferin. The band of the Foot Guards played "God save the Queen," and His Excellency drove off amid cheers.

VII. Departmental Notices.

TEACHERS' VOTING PAPERS.

A Voting paper (as intimated in the last number of this *Journal*) was sent to every School Master and Teacher in Ontario, to be filled up and returned to the Chief Superintendent of Education, between the Eleventh and Eighteenth days of August, both days inclusive. The parties concerned will please send in the voting paper at the dates specified in the Act for sending them to the Chief Superintendent.

In putting up this paper and sending it to the Chief Superintendent, the following directions should be followed, viz. :—

1. Every blank in the form of Voting Paper should be filled up, and the names signed at the bottom of the paper on the line left for that purpose.
2. The Voting Paper should be enclosed in the envelope and may be sealed up.
3. The name of the County, City or Town in which the Voter's school is situated, had better be inserted in the blank, printed on the outside of the envelope.
4. A one or three cent postage stamp, as the case may be, should be affixed to envelope before mailing it.

CORRECTION.

In List of Certificates published in the *Journal of Education* for July, for "Brown, E. James," read "Brown, William Greenwood," and for "Hagarty, Sara," read "Hagarty, Kate."

DAILY AND GENERAL PUBLIC SCHOOL REGISTER.

Public and High School Teachers are required by law to use these Registers in the form prescribed by the Department, and the Trustees are required to procure them at the expense of the school concerned.

Inspectors will see that none but the prescribed Registers are used in the schools, especially as some of the forms and other returns required by law, are based upon these Registers in their prescribed form.

THE GENERAL REGISTER for use in the Public Schools of Ontario, as required by the Official Regulations, is now ready, and can be supplied to schools on the following terms, viz. :

- | | |
|--------|---|
| No. 1. | Copy of 20 pages, paper cover, 20 cts., or free by post 25 cts. |
| 2. | do 40 do stiff cover, cloth backs, 30 cts., or do 40 " |
| 4. | do 60 do do do 50 cts., or do 55 " |
| No. 2. | Daily Public School Register, 20 cts., or free by post 25 " |
| 3. | High do do 20 cts., or do 25 " |

VIII. Advertisement.

UNIVERSITY OF TRINITY COLLEGE.

(INCORPORATED BY ROYAL CHARTER.)

MEDICAL DEPARTMENT.—WINTER SESSION 1874-'75.

FACULTY.

- E. M. HODDER, M.D., F.R.C.S., Eng.; F.O.S., Lond.; Dean of the Faculty, and Consulting Surgeon Toronto General Hospital and the Burnside Lying-in Hospital.—159 Queen Street West. Prof. of Obstetrics, and diseases of Women and Children.
- W. B. BEAUMONT, M.D., F.R.C.S., Consulting Surgeon Toronto General Hospital. Emeritus Prof. of Surgery.
- NORMAN BETHUNE, B.A., M.D., Edin.; M.R.C.S. Eng.; F.R.C.S., Edin.; F.O.S., Lond.; Consulting Physician Toronto General Hospital and Burnside Lying-in Hospital.—24 Gerrard Street East; Prof. of Surgery and Clinical Surgery.
- WALTER B. GEIKIE, M.D., F.R.C.S., Edin.; L.R.C.P., Lond.; F.O.S., Lond.; Physician Toronto General Hospital.—Cor. Gould and Yonge Streets; Prof. of Principles and Practice of Medicine.
- J. FULTON, M.D., M.R.C.S., Eng.; L.R.C.P., Lond.—334 Yonge Street. Physician to the Hospital for Incurables; Prof. of Physiology and Sanitary Science.
- W. COVERTON, M.D., M.R.C.S., Eng.; Prof. of Pathology and Medical Diagnosis.
- J. E. KENNEDY, A.B., M.D., F.O.S., Lond. Prof. of Materia Medica and Therapeutics.
- J. ALGERNON TEMPLE, M.D., M.R.C.S., Eng.; F.O.S., Lond.; Attending Physician Burnside Lying-in Hospital.—144 Bay Street. Prof. of Medical Jurisprudence and Toxicology, and Assistant Lecturer on Obstetrics, &c.
- W. H. ELLIS, M.A., M.B., L.R.C.P., Lond. Instructor in Chemistry, College of Technology; Prof. of Chemistry—General and Practical.
- H. ROBERTSON, M.B., M.R.C.S., Eng.—255 Yonge Street. Prof. of Anatomy—Descriptive and Surgical.
- J. FRASER, M.D., L.R.C.S., Edin.; L.R.C.P., Lond. Demonstrator of Anatomy.
- A. J. JOHNSTON, M.D., M.R.C.S., Eng.; F.R.M.S., Lond.—Microscopy.
- C. W. R. BIGGAR, M.A.—Botany.
- The Session will commence on THURSDAY, the 1st OCTOBER, 1874, and continue for Six Months. The Lectures will be delivered in the New College building, close to the Toronto General Hospital. Full information respecting Lectures, Fees, Gold and Silver Medals, Scholarships, Certificates of Honour, Graduation, &c., will be given in the annual announcement.
- E. M. HODDER, *Dean.* W. B. GEIKIE, *Sec.*