

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. 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 filming, are checked below.

L'Institut a microfilmé 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 filmage sont indiqués ci-dessous.

Coloured covers/
Couverture de couleur

Covers damaged/
Couverture endommagée

Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée

Cover title missing/
Le titre de couverture manque

Coloured maps/
Cartes géographiques en couleur

Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)

Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur

Bound with other material/
Relié avec d'autres documents

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

Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
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 filmées.

Coloured pages/
Pages de couleur

Pages damaged/
Pages endommagées

Pages restored and/or laminated/
Pages restaurées et/ou pelliculées

Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées

Pages detached/
Pages détachées

Showthrough/
Transparence

Quality of print varies/
Qualité inégale de l'impression

Continuous pagination/
Pagination continue

Includes index(es)/
Comprend un (des) index

Title on header taken from: /
Le titre de l'en-tête provient:

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments:
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The Canada School Journal.

VOL. VII.

TORONTO, JANUARY, 1882.

No. 56.

The Canada School Journal

IS PUBLISHED THE FIRST OF EACH MONTH AT

11 WELLINGTON ST. WEST, TORONTO, ONT., CAN.

Subscription \$1.00 per year, payable in advance.

Address—W. J. GAGE & CO., Toronto.

CANADA SCHOOL JOURNAL HAS RECEIVED

An Honorable Mention at Paris Exhibition, 1878.

Recommended by the Minister of Education for Ontario.

Recommended by the Council of Public Instruction, Quebec.

Recommended by Chief Superintendent of Education, New Brunswick.

Recommended by Chief Superintendent of Education, Nova Scotia.

Recommended by Chief Superintendent of Education, British Columbia.

Recommended by Chief Superintendent of Education, Manitoba.

The Publishers frequently receive letters from their friends complaining of the non-receipt of the JOURNAL. In explanation they would state, as subscriptions are necessarily payable in advance, the mailing clerks have instructions to discontinue the paper when a subscription expires. The clerks are, of course, unable to make any distinction in a list containing names from all parts of the United States and Canada.

1882.

We most cordially wish all our readers the best compliments of the season. We venture to hope that the New Year of 1882 will find them more earnest, and enthusiastic teachers than they were at the beginning of 1881. We trust that most of them have been re-engaged at higher salaries. It is one of the functions of the CANADA SCHOOL JOURNAL to make them worthy to receive higher salaries, by fitting them more fully to perform their important duties. Any teacher whose position is worse this year than it was last year should look carefully and honestly through his own record, and take stock of his own efforts to improve himself, before he blames trustees, or rails at fate.

We part from 1881 with the most kindly feelings. He has been unusually kind and generous towards us. The subscription list of the JOURNAL has been increased even beyond our most sanguine expectations. We have become more widely acquainted with the teachers and inspectors throughout the country, and there is no flattery in the statement that the more we know of them, the more we respect them for their intelligent devotion to their work. We heartily thank our large circle of friends for their assistance during the year, in extending our circulation, in contributing valuable articles, in communicating items of educational news, and in making suggestions for the better adaptation of the JOURNAL to the needs of the teachers, whose best interests it is our aim to advance. For the future we promise to be all of good that we have been in the past, and to still strive to make every improvement which we believe will make the JOURNAL more useful to the great army of teachers in helping them to do their daily work with less strain on themselves and with more profit to their pupils. We request every teacher in Canada to become a member of our staff by sending brief statements of educational news from his vicinity, in a form in which they may be handed to the printer. We will send special reporters as far as possible to conventions and other

educational gatherings if duly notified. If we are unable to do so we request the proper officer to send us an abstract of the work done.

We repeat in closing the wish that each one of our readers may receive all the best blessings of Christmas, and all the brightest hopes of New Years; and we sincerely hope that the CANADA SCHOOL JOURNAL may largely aid in making their next Christmas and New Year's Day more full of peace and promise than any that have preceded them.

THE TEACHER'S RESPONSIBILITY.

—We commend to our readers the following extract from an educational address of that great statesman and Christian, the eloquent and philosophic Guizot. No nobler or more inspiring words, we are sure, could greet the eyes of the teachers of Canada as they open the first number of the CANADA SCHOOL JOURNAL for 1882:

"All the provisions hitherto described would be of none effect, if we took no pains to procure for the public school thus constituted, an able master, one worthy of the high vocation of instructing the people. . . . Humble as the career of a schoolmaster may seem to be, and though often doomed to pass his whole existence within the sphere of a small community, his labors are, nevertheless, felt throughout society at large, and his profession is as necessary and important as that of any other public functionary. It is not for any particular or merely local interest, that the law demands that every man should acquire, if possible, the knowledge which is indispensable in social life, and without which, intelligence languishes and degenerates; it is for the STATE ITSELF and the public interest; it is because liberty is certain and steadfast only among people enlightened to listen, in every circumstance, to the voice of reason. PUBLIC ELEMENTARY INSTRUCTION IS ONE OF THE GUARANTEES OF ORDER AND SOCIAL STABILITY. Doomed to pass his life in discharging the duties of a somewhat monotonous vocation, often even in struggling with the injustice or the ingratitude of ignorance, the teacher would often repine and perhaps sink under his afflictions, did he not draw strength and courage from another and higher source than that of immediate and mere personal interest. A deep sense of the moral importance of his duties must support and encourage him. He exhausts his strength in sacrifices which are scarcely noticed by those who reap their benefit; he labors for his fellow-beings and looks for his reward to God. . . . His first duty is towards the children confided to his care. The teacher is summoned by the parent to share his authority, this authority he must exercise with the same vigilance and almost the same affection. Not only is the health of the children confided to his care, but the cultivation of their affections and intelligence depends almost entirely on him. In confiding a child to your care, every family expects that, as much as lieth in you, you will send him back an honest

man : the country, a good citizen. Bestowing due care on the understanding, neglect not the moral qualities of your pupils. Unceasingly endeavor to propagate and establish those imperishable principles of morality and reason, without which universal order is in danger ; and sow in the heart of the young those seeds of virtue and honor which riper years and maturer passions will never destroy. Faith in Divine Providence, the sacredness of duty, submission to parental authority, the respect due to the laws, to the king, and the rights of every one ; such are the sentiments which the true teacher will aim to implant and develop."

UPPER CANADA COLLEGE.

During the past month we have availed ourselves of our exceptionally good opportunities for becoming acquainted with the state of feeling throughout the country regarding Upper Canada College, as there is every probability that it will be one of the most important subjects submitted before the House during the coming Session.

The advocates of the continued existence of Upper Canada College urge in its favor : (1) That it is necessary as a preparatory school for young men who intend to take a University course ; (2) That there should be a State Institution for the benefit of those who wish to send their sons from home to receive their education ; (3) That it serves as a Collegiate Institute for a part of the City of Toronto.

Those who favor the discontinuance of the School reply to the above as follows :

1. It is no longer necessary as a preparatory school for University men, as the Collegiate Institutes and High Schools throughout the country are doing better work than Upper Canada College in training young men for the Toronto and other Universities. This is now an established fact.

2. There should be no attempt made to found or continue in existence State Educational Institutions to meet the special cases of individuals. It may often be advisable for a man to send his son from home to pursue his High School studies, but there are over one hundred High Schools to either of which he may send him, so that Upper Canada College need not be perpetuated for this special purpose. But he should have some one in connection with the school to superintend his conduct outside of the class-room, to see that he prepares his lessons properly, avoids bad company, etc. Admitted, but no one has a right to expect the State to assume the duties of a parent towards his children until they become orphans. Then it may do so by providing Industrial Schools. The State provides education, not parental supervision for those children who have parents. For those who think they can not, in the best interests of their children, send them to a High School at home or at a distance, there are several institutions of which Pickering College may be taken as a model, which perform both the functions of teacher and parent so far as they can be combined. A parent may in this respect obtain in private institutions, all that Upper Canada College with its enormous State aid has

to offer, and at quite as good rates. We have no Canadian aristocracy, and those who desire exclusiveness for their children should pay for it. No one will interfere with their right to do so.

3. The City of Toronto has no right whatever to have a portion of its legitimate High School expenditure paid by the province at large. There is no reason why Toronto should be so aided that might not be urged in favor of every town and village in the country. Toronto would likely have to provide more High School accommodation if Upper Canada College ceased to exist. Let Toronto do so, as any other city or town has to do. She is increasing so rapidly that the time will probably soon arrive when the High School Board will have to open an additional school for the accommodation of those residing in the west end. This will be brought about all the sooner if the proposed extension of her limits is carried out.

It is sometimes said that if the staff of teachers was improved the College would be more prosperous. This may be quite true. We have no doubt that the managers of a private institution, or the trustees of an ordinary High School would have made some changes long before this under similar circumstances, but this does not in any way affect the question at issue, viz : whether the country should continue an expenditure of nearly \$30,000 per annum to do two kinds of work, one of which the State has no right to do, while the other is better done by the regular schools which form a part of our educational system ?

What should be done with the money invested in Upper Canada College, is a question that must be taken into consideration, when its discontinuance is discussed. The valuable property which it occupies, coupled with its endowment, would produce an annual income of nearly \$30,000. Some say this should be distributed to the High Schools. We think the money might be more profitably spent, and would renew the suggestion first made in the JOURNAL, that a portion of the money derived from the consolidation of its assets be spent in erecting near the University a college for the higher education of women, when the proper time arrives, and in endowing it. The erection of such a college is in our opinion merely a question of time, and if the time has not already come the money could be funded until the necessity for the college is more manifest. The balance might very properly be appropriated for the endowment of two chairs in the Toronto University. Is it not time that those University men who intend to be the masters in Collegiate Institutes and High Schools should receive a special course of training in Education during their University course? The teachers of the future are receiving their education in the High Schools ; how essential it is therefore that the Principals in them should understand the principles on which the practice of education is based. Theoretical training would not of course be sufficient, but the practical training could easily be provided. There is an opportunity for the Government to do immense good to the best educational interests of the country, by imitating the example of some of the universities in Britain and the United States, by establishing a Chair of Education in our University. It is well known

to those connected with the University that the able and indefatigable President, Dr. Wilson, has in addition to the arduous duties of his office to do the work usually performed by two professors. He should be relieved of a portion of his work, and either History or Literature assigned to an additional professor.

GLEANINGS FROM THE COUNTY CONVENTIONS.

READING is a very important subject. More time is spent in teaching it in proportion to the progress made than in teaching any other subject. We have frequently urged the necessity for improved methods of teaching this subject in elementary classes. We are delighted to notice how frequently the conventions discuss this question, but it is a cause for regret that the subject of reading in the advanced classes is not more often considered. When the able and observant Chief Superintendent of Manitoba reached Ontario recently to study its system of teaching and of training teachers, one of the first questions he asked, was "How is it that reading is not taught in the schools of Ontario." Enquiry from him brought out the fact, that many of the teachers who had gone from Ontario to Manitoba, had informed the Examining Board there, in explanation of the fact that they were such poor readers, that they did not receive a single lesson in reading while at the High School. From enquires we have made we are ashamed to confess that they told the truth. The teachers say "they have not time!" Then time should be taken from other less important subjects. The Examiners who conduct the professional examinations in Ontario agree with Rev. Mr. Pinkham that the great majority of those who leave our Normal Schools cannot read well. We hope they will let it be known that they regard it as a "plucking subject."

We were much struck by some remarks made at the last convention for the County of Durham by Mr. Oliver, Headmaster of Bowmanville High School, concerning this subject. He held that the critical study of the thirteen lessons in the Fourth Book by candidates for admission to High Schools had a very bad effect on the reading; and in proof of his statement, he called attention to the fact that very many children read much better while in the Second or Third Reader, than they do after they have read for some time in the Fourth.

We believe that there is much truth in Mr. Oliver's remarks, and unfortunately the pupils receive no compensation in literary training at all adequate to the evil effects on their reading. Not one of the thirteen selections is taken from the writings of a standard English author.

In connection with the preceding paragraph, we take pleasure in recording our hearty endorsement of the efforts made by Miss Catharine Lewis at so many of the teachers' conventions to improve the style of reading and the method of teaching it, both to primary and advanced classes. She is a most accomplished reader, and a very thorough and practical teacher. She has been most cordially received by the convention, which she has attended, both as a public reader, and a teacher of elocution.

Miss Lewis has recently been appointed teacher of elocution in the Toronto City Model School. We wish that more atten-

tion could be given to teaching how to read in all County Model Schools.

It is very gratifying to notice that the three "neglected subjects," Drawing, Music, Drill and Calisthenics, are receiving so much attention at the conventions in all parts of the province. They have already been dealt with very largely in the Practical Department of the JOURNAL, and we intend to continue to supply our readers with articles concerning them from practical teachers.

Speaking of the value of drill as a disciplinary agency in schools, Mr. J. R. Miller, the efficient Inspector of Schools in Huron County, recently said, "he believed he had the most uniformly well-behaved schools in his county to be found in any county in the province, and that both he and his teachers agreed that the revolution which had been wrought in the conduct of the pupils throughout the county was mainly due to the practice of drill in the schools." Mr. Miller himself instructs the teachers in training at the County Model School how to teach this important subject.

Complaint was made before the Library Committee of the Brant Co. Teachers' Association at the late convention, that the library was not made use of by the majority of the teachers. Some of the members were ignorant of its existence; many, through distance, could not avail themselves of it, but would prefer to receive the CANADA SCHOOL JOURNAL or some other good educational paper instead. A free library is a most valuable possession for teachers to have, but under existing arrangements it is almost useless. The theory is good but the practice is ineffectual, for several reasons—chiefly because teachers in country sections cannot, without much inconvenience, get the books they require, and when they do get them, find a difficulty in exchanging them. A large proportion of teachers never trouble the librarian, and are so apathetic about the affairs of the Association that they do not care to become paying members. In some counties every member who pays a certain fee receives a copy of the SCHOOL JOURNAL monthly, and enjoys all the privileges of membership. In these counties the fee is given cheerfully, and membership is desirable, because teachers—like other shrewd people—desire some tangible return for the money they pay, and the bonus is always satisfactory when it comes to their homes monthly in the shape of the JOURNAL.

PHYSICAL EDUCATION.

The excellent articles on "The Co-education of Mind and Body," by Dr. McLaughlin, M.P.P., and "Hygiene," by Inspector Fotheringham, are typical of a large number of a similar kind that have recently been presented to teachers' conventions. We gladly present them to our readers, with the earnest hope that they will be carefully read, and that the wise suggestions they contain may be very extensively put in practice. We would also direct attention to the article in the Practical Department containing directions concerning the proper positions of the bodies of the pupils while engaged at school duties or exercises. This

part of physical education has been long neglected, and Inspectors would do well to see that the teachers in their districts pay strict attention to all the details, which go to make school life less destructive of vital energy, and less injurious to the physical organization of pupils generally.

—During a recent visit to Lindsay, we had the pleasure of gaining a knowledge of its scholastic institutions, and we came away with the conviction that foreigners who wished to get in a single day a view of well-conducted Canadian schools of all grades, Public, High, Separate, and Private, should be sent to Lindsay. Education is the one public work which its citizens seem to have united in promoting, and the result is that from being one of the most turbulent towns in the province as it once was, it is now peaceable and prosperous.

—Much of the active interest shown by all classes in Lindsay in the cause of popular education can be directly traced to one man, Father Stafford. When appointed to his present charge, he found educational affairs at a very low ebb. He at once began to direct the attention of the people both in the town and its vicinity to the necessity for giving their children a good education. By a long course of encouragement and exhortation, which would have wearied the patience of a less persistent man, he at length succeeded in leading all classes to exhibit a proper degree of enthusiasm in regard to their schools. He taught the parents to respect the rights of their children, and convinced them that a good brick school-house was the best investment for the money they intended to devote to the welfare of their sons and daughters. They have found that it pays to take a deep interest in education, and there is no portion of Ontario where more attention is paid to the subject than in Lindsay and the portion of Father Stafford's parish outside of it. He still gives a great deal of attention to the subject, and has lately returned from a tour in Europe, where he made a special study of recent improvements in the systems and methods of teaching. We were pleased to find him so hearty and vigorous after his holiday trip, and hope he may long be spared to be the educational as well as the spiritual guide of his people.

The closing exercises of Hellmuth Ladies' College were extremely interesting and attractive. A well-arranged and creditably executed concert brought together a large party of friends, who greatly enjoyed the annual treat. At the conclusion of the concert, the Bishop of Huron presented the Governor-General's silver medal to Miss E. Roberts, for general proficiency, and a diploma to Miss A. Seaborne. The teaching staff of the College and the pupils availed of the occasion to present the Lady Principal, Miss Clinton, with an address, which was read by Rev. G. O. Troop, and to which His Lordship the Bishop responded.

The Lindsay Public Schools form the Model School for training the teachers of Victoria County. From what we were able to see of them, we judge that young teachers would be able to learn much that would direct and inspire them in the performance of their work from Mr. McFaul and his able associate teachers. While no part of the programme of school-work is

neglected, the strongest special features of the School seem to be the excellence of the drawing, penmanship, and primary reading, and the attention very properly paid to school drill. It is a pity that on account of heavy outlay in other departments of school expenditure, the School Board has this year reduced the salaries of some of their teachers. We hope the reduction may be only for a short time.

The most rapid development that has been made by any of the Lindsay schools has taken place in its High School during the time that Mr. W. E. Tilley has been its Headmaster. It is expected that the school will be recognized as a Collegiate Institute at the beginning of next year. There are already five teachers employed in the school. The Trustees are anxious to enlarge the High School next year, but they find themselves already face to face with the progress-throttling 29th Clause. Let us hope that it may be removed from the Statute Book before the building season opens in the spring.

A large assemblage met at Alma College last month to witness the inauguration of the Faculty. Bishop Carman took the chair at 8 o'clock, and near him were Judge Hughes, Registrar McLachlin, Colin Macdougall, Esq., Revs. A. E. Griffith and W. G. Prown, members of the Board of Management. After the declaration by His Lordship, the Registrar presented Principal Austin as President of the institution; Rev. R. J. Warner, B.A., Professor of Modern Languages and English Literature, Miss Maggie Baker, perceptress; Mrs. Margaret Capsey, governess, and assistant in English studies; Miss S. E. Sisk, assistant in instrumental music; Prof. F. M. Bell Smith, professor of painting, drawing, and elocution; Miss E. Gibbord, teacher of fancy work, Miss A. Brotherhood, assistant in painting and academic teacher. The members of the faculty having taken the usual obligation, the Bishop invoked the Divine blessing on the institution, after which Principal Austin gave an impressive lecture on "The Higher Christian Education of Women: its Mission and Methods." The Rev. A. E. Griffith pronounced the benediction, which concluded the proceedings.

—Mr. C. L. Crassweller, one of the Assistant Masters of the Goderich High School and a third year Undergraduate of the University of Toronto, has been appointed, out of a large number of applicants, to the Commercial Mastership of Pickering College. Mr. Crassweller's record as a student is a brilliant one—Second Class A. Dec, 1878 with 79 marks out of a possible 80 in Bookkeeping, a First Class in Mathematics and the General Proficiency scholarship at the Senior Matriculation Examination in 1881. This shows good work for one who was teaching nearly all the time. At the Second Year Examination he also won the Second Proficiency Scholarship. As a teacher Mr. Crassweller's success has been equally pronounced.

—We are pleased to observe that Mr. A. L. Parker's high merits and ability have been recognized by the educational authorities and that he has been appointed to the Inspectorship of Algoma and Parry Sound during the absence of Mr. P. A. Switzer through illness.

—We notice that Brantford has recently entrusted to Mr. Wilkinson, the experienced Principal of the Central School, the control of the Ward Schools also.

—The conclusion of the year's work in Smith's Falls High School has showed very satisfactory results. The indefatigable labors of Mr. J. A. Clarke, M.A., B.Sc., Headmaster, and his staff, have been appreciated by all concerned. Mr. Clarke was presented by his pupils with a handsome silver pen-rack well stocked, accompanied by an address breathing a spirit of harmony and confidence. Mr. D. M. Stewart, assistant, received two large and useful volumes as a mark of his pupils' esteem.

—It is with much pleasure we record the unanimous appointment of Mr. J. B. Somerset to the Inspectorship of City Schools, Winnipeg, Manitoba. For some years Mr. Somerset has held the office of Inspector of Lincoln County Schools, where his devotion to duty, together with his high qualifications, earned for him universal respect and esteem. While we regret losing him in this Province, we feel he is a gain to his new field of labor, where his thorough mastery of all the details of the profession will be a benefit, and his kind, genial manner, will win many new friends.

The prize distribution at Cobourg Collegiate Institute, Mr. D. C. McHenry, M.A., Principal, was the occasion of a large and influential assembly. Andrew Black, Esq., Chairman of the C.I. Board occupied the chair, and gave an opening address in which he reviewed the history of the school and stated that he was proud to say that its present position was one of unprecedented prosperity. The prizes were donated by James Cockburn, Esq., M.P., J.C. Fields, Esq., M.P.P., and J. Vance Gravely, Esq., Mayor. The Rev. Mr. Petley gave a prize for German, and spoke of the success of the school of which he was once a student. Messrs. D. M. Stickney and F. B. Stacey came out equal at the late intermediate examination, and were each entitled to the Governor-General's Medal, but as one only could get it, the C. I. Board decided to give the other a handsome prize in books. By common consent the medal was awarded to Mr. Stickney and the books to Mr. Stacey, both prizes being presented by the chairman. Dr. S. S. Nelles gave a short address.

—We were surprised at the state of efficiency which we found to exist in the Public Schools of Port Hope, when, a short time ago, we were fortunate enough to look through them, under the guidance of Mr. Goggin, the able Principal. We were not long in doubt as to the source of the good order, and the uniformly excellent methods of teaching which we observed. The people of Port Hope believe in allowing the manager of their Public Schools to have powers similar to those given to an experienced manager of a bank or other business concern. Mr. Goggin has control of all the Public Schools in the town, and they flourish under his management.

—Our Editorial note referring to Ottawa Collegiate Institute, last month, got mixed at the end, in some unaccountable way. It should be, "It is proposed to increase the staff by appointing an additional University man in classics, at a salary of \$1,000," &c.

—We notice that Dr. Harris, Chairman of the Education Committee of Brantford Public School Board, has published a very effective letter in the *Expositor*, concerning the animated school discussion which has recently been going on in that city. The Doctor writes ably from the standpoint of a clear-headed trustee in defence of the appointment of Mr. Wilkinson to take charge of the Ward Schools as well as the Central Schools. He fully sustains the action of the Board, and we think replies satisfactorily to charges made against it.

It is rumored certain changes in the management of the Hamilton Public Schools will soon take place. It is not improbable, that a Principal who has been unable to keep up the standing of his Collegiate Institute, notwithstanding his peculiar facilities for advertising, and *with liberal scholarships offered to successful students*, and who has failed to inspire the Public School teachers, over whom he has been placed, with enthusiasm, should be called to account by an intelligent Board composed of clear headed, business and professional men.

Correspondence.

To the Editor of the Canada School Journal:

SIR,—There is a matter in connection with the last examination for admission into High Schools and Collegiate Institutes which, I think, is deserving of public attention. On page 253 of the "Compendium of School Law and Regulations," it is clearly stated what ground this examination is to cover, and I wish to point out two instances in which the examiners seemed to have entirely ignored these regulations. We read there that in the subject of spelling the candidates shall be examined from the "Fourth reading-book to page 246, and spelling-book," and yet at the late examination the spelling was from pages 256 and 269. Every teacher knows that the Fourth Reader is the most difficult one of the series, and in the first 246 pages there is surely ample scope for selection without going beyond the limit. Now, Mr. Editor, is it fair to thus deceive teachers? Is it just to thus treat candidates, especially when it is remembered that, as one-third of the marks in each subject must be obtained, eight blunders in spelling will "pluck?"

Again, in the regulations we read that the arithmetic examination shall be on "principles of Arabic and Roman notation; vulgar fractions; decimal fractions; simple proportion, with reasons of rules; mental arithmetic." And yet at the late examination the last question on the arithmetic paper is one in percentage, and more marks are assigned to it than to any other on the paper. Should such an examination stand?

Having briefly pointed out these facts, I will in conclusion state clearly my position. If the standard be too low, by all means raise it; but having issued regulations, carry them out or issue none, and then we will never be surprised at any form the examination may take.

I hope some successful defence may be given on behalf of the examiners.

Yours, &c.,

Waterloo, Dec. 28.

W. F. CHAPMAN.

Contributions.

THE CO-EDUCATION OF MIND AND BODY.

BY J. W. MCLAUGHLIN, M.B., L.R.O.P., L.R.O.S., ED.

(An address delivered before the Durham Teachers' Convention.)

The human system is a complex mechanism, composed of parts very dissimilar in their form and structure, but so admirably con-

nected and adapted to one another as to form a whole of great simplicity and perfection. But however wonderful the structure of the human frame, more wonderful still is its motive power—the power by which all the varied motions and functions of the body are accomplished—the power by which, without taking thought on our part, the food partaken of is digested and finally converted into blood for the nourishment of the various parts of the body—the power by which, even in moments of unconsciousness, the chest rises and falls in the act of breathing—the power which prompts the heart to its ceaseless toil of distributing the blood to all parts of the system near and remote. What is this power, and whence its origin? In this age of gigantic monopolies, Gould lays his hands on the lines of a continent and plants his great central batteries in New York, and with the gentlest pressure of his finger upon the electric key he makes his will known to the remotest corners of the earth. Not only can the electrician in New York send the electric current along many wires to many widely separated points at the same instant of time, but selecting a single wire his behests may be sent solely to the humblest hamlet in the land. Very similar are the origin and workings of that power which controls the operations of the human system. The brain is the great nerve battery which moves the whole machinery. The nerve cords are threads which connect the centre with every portion of the body, however minute are the wires along which the nerve current flows to accomplish its mission. The mind is the operator which determines to what part of the body a message shall be sent, and what that message shall be. So long as Gould's batteries are efficient, and his wires intact, he can sit down to his instrument with the full assurance that there will be a prompt response to the touch of the key, at any point to which his wire runs. But should his battery become impaired, or his chemicals exhausted, or his wires broken, Gould, with all his wealth, all his commercial and electric experience, is feeble as a babe to elicit from his apparatus the response he desires. So it is with the human organization. Impair the nerve batteries or their connections, impair any of the many organs which manufacture and purify the blood, which nourish the nerve centres and keep them in repair, and however well educated the mind and however powerful the will, the system will not, and cannot, respond to the calls upon it. A sound digestive apparatus is essential to the manufacture of blood. Good lungs are essential to its purification, and pure blood essential to the healthy operations of the brain.

Importance of physical exercise.—But experience in all ages and climes has proved that without physical exercise the organs of the system cannot be maintained in a healthy condition, and hence it is that wholesome mental toil is inseparable from physical exercise, or "co-education and development of mind and body" is the sound doctrine. Every intelligent member of the human race affords a wonderful example of what may be accomplished under this combined system. Here is a child of five years. Has his mind during this short period been quiescent? Has his brain not been the seat of ceaseless energy and activity? He has learned the name of every article in his home, in the garden, by the roadside, everywhere. He has also learned the use of them all. He has learned to speak a language. How has that tiny form with his delicate, unfolding organs accomplished a task of such magnitude? What is the secret of the child's wonderful achievement? It is this: The ceaseless activity of his mind is accompanied by the ceaseless activity of his body. As he runs he learns, and as he learns he runs.

The great error of our educational system is that it has overlooked the necessity for this co-education, this co-development of mind and body. A child of five or six years upon entering school changes a life of physical freedom for that of physical imprisonment for four, or five, or six hours daily. But I will be told the programme of studies provides that drill and calisthenics shall be taught through every grade of the Public Schools. Yes, these subjects are in the programme, but they are not in the schools, and they are not because they are crowded out by the multitude of other subjects demanding attention. Drill and calisthenics are added to the list of studies as a sort of appendage, more for ornament than usefulness, and this has been its practical working. Of the 487,012 who attended our Public Schools in 1879, only 58,507, or one in every

eight, studied drill and calisthenics. Of the 12,136 who attended the High Schools in this same year, only 2,857, or one in four and a half, studied these subjects. Although I cannot speak authoritatively, my enquiries lead me to believe that even where these subjects are said to be taught, the instructions are, in most cases, of a very superficial and perfunctory character.

How to combine physical and mental culture.—Practically, therefore, as a system of instruction, physical development, along with mental culture, is to a very great extent ignored, both in the Public and High Schools of our Province. I shall now endeavour to answer the important question. How may mental and physical culture be combined in a system of education? 1st. In the school-room the attitude of the pupil, whether sitting or standing, should never be prejudicial to health. The importance of this rule will be appreciated when I tell you that deformities which disfigure for life are acquired in the class-room. These are mainly, so far as my observation goes, exclusively spinal in their character.

Spinal deformity and the ease with which it may be produced will be readily understood when we recall the structure of the spinal column. It is composed of 24 bones, connected by 23 soft cushions each about one-quarter the depth of the adjacent bone. A column, therefore, of 25 inches will comprise 5 inches of this connective tissue. One—and the most important—property of this tissue is elasticity. When submitted to pressure it yields to it, just as rubber does; but whilst the rubber immediately returns to its natural state when the pressure is removed, the elastic cushions do not until after considerable time has elapsed. That I may impress this property of spinal connective tissue the more firmly on your minds, let me narrate the following physiological experiment:—The height of seven persons was taken at night and in the morning, with the following results. The ages of the persons measured varied from 40 down to 5 years. The following are the figures, commencing with the eldest:—

	Age.	Height at night.		Morning.		Increase.
		Ft.	In.	Ft.	In.	
1	40	5	9	5	9½	½
2	33	5	2½	5	3½	½
3	26	5	1½	5	2	½
4	14	5	0½	5	1½	½
5	11	4	5½	4	6½	½
6	9	4	3	4	3½	½
7	5	3	4½	3	4½	½

A cause of spinal curvature.—There is thus a gain during the night of from ½ to ¾ of an inch, or reversing the order, there is a loss in height going on constantly during the activities of the day, amounting at its close to ¾ of an inch in the adult and to ½ an inch in a child of five years; and all this is due to the condensation of the elastic tissue between the bones of the spinal column. You will have no difficulty now in understanding that if any unnatural position of the spine is assumed and maintained from day to day and week to week, the position becomes a fixity—a deformity. A child seated at a high desk in using the right arm, in writing, &c., cannot avoid curving the spine to the right. A pupil seated at a very low desk must stoop forward to his work, and the spine is bent backward at the shoulders. Humpback is produced. But apart from a want of adaptation between pupil and desk, these deformities are often, I believe most frequently, the result of careless, lazy habits on the part of the pupil, and thoughtlessness or neglect on the part of the teacher. Pupils assume, and are allowed to assume, almost any attitude—often abnormal attitudes in their seats. But a greater mistake, and it seems to be almost universal, is the vicious position a pupil is allowed to maintain in the reciting class, especially in reading. The book is firmly grasped in both hands, the head is bent forward as far as a long-suffering spine will allow, and in this mischievous attitude a child in the lower divisions passes hours daily. But some one will say, what if these curvatures are acquired? After all is said, it is but a little deformity. Were I to ask you to correct these errors for the sake of adding grace to the figure, it would be an object not unworthy your most serious consideration. But apart from elegance of form there are reasons of a sanitary character of far greater importance. Every departure from the natural position of the spine entails a diminution of the chest cavity, and, consequently, a diminution of lung capacity to purify the blood. To establish this proposition by a reference to the complex mechanism of the chest would involve more of your time than I find at my disposal. The simplest proof I can give you is drawn

from your own experience. Almost everyone at some period or other, has vied with his companion in endeavouring at the greatest possible distance to make the flame of a lamp or candle flicker by blowing upon it. Should there be anyone within my hearing to-night who has never tried this experiment, I ask you to do so, and note particularly the attitude you instinctively assume. The body is made erect, the shoulders thrown back, the chest forward. And why? Because in this position more air can be taken into the lungs than in any other position, and the more air drawn into the lungs, the more can be driven out, and the more air driven in a particular direction by the same force, the farther its effects will be felt. Hence the straight, the erect, the natural attitude is that in which the lungs are well expanded in breathing, and if kept in this form day by day in the maturing child, they will develop into large lungs—lungs which can with ease and certainty perform their important function of purifying the blood. On the other hand, allow the spine to curve laterally or to bend forward, and full lung development is arrested. Smaller lungs are formed, and the purification of the blood is less perfect, and the tax upon their energies greater. Large lungs in a well formed chest mean comparative immunity from lung disease, especially consumption. Small lungs in a contracted, badly-formed chest, mean a tendency to disease, especially consumption. Much is said about hereditary pre-disposition, or the tendency children have to inherit the disease of their parents. We are told, e. g., that the child of consumptive parents enters upon existence with the germs of disease floating in his system, and only awaiting (it may be for twenty, thirty, or fifty years) a favourable opportunity for development—an opportunity for the germ to take root and bring forth fruit for the grave. This theory, which I cannot believe to be the correct one, has in it a fatalism so sad and discouraging that no one having the ill-fated germ could be aroused to make a struggle for life.

The correct theory I believe to be this: A consumptive parent with a badly formed chest, containing small lungs, may give, indeed is almost certain to give to the child, a chest and lungs of the same conformation; and what will be the destiny of that child? To a very large extent the destiny will be what his parents and teachers make it. I have no hesitation in affirming that a diligent attention to the principles I have been endeavouring to inculcate, with the observance of other sanitary measures, will go far to avert the calamity which befalls the parent. But some objector will complain that a rigid adherence to this straight, erect position will become tedious to the pupils. It will do so, however, only for a very short time, only until properly acquired, and then it will prove a source of comfort rather than a source of weariness.

Class-room calisthenics. 2. This brings me to the discussion of the second method of joint physical and mental culture, viz., class-room calisthenics. These exercises, consisting mainly for the class-room, of certain regular motions of the arms and head quickly executed, are intended, first, to call away the mind from the worry of study, and rest the brain, and second, to give vigor to the system by muscular exercise. At a certain word of command, given in a clear, firm tone by the teacher, see that every pupil instantly drops his work and obeys the order with the promptitude of a disciplined soldier. Give even one minute of vigorous calisthenic exercise, and the pupils will return to their studies with clearer and more vigorous brains, and the minute or two spent in the exercise will prove to be the very best kind of investment, both for mind and body. The traveller at sea hears the cry given, in a clear, stentorian voice, "Man the boats," and instantly it is repeated by the mates, until in a moment of time the command is clearly heard from stem to stern of the vessel. The cooks drop their pastry; the stewards cease their service. Every hand of the vessel hastens to his allotted boat, and in an incredibly short time the boats are swung clear of the vessel and lowered, and then returned to their places, and the hands all back to their work again. The discipline of the tar enables him to accomplish this work in the smallest interval of time. And why not the pupil? But another objector will say, "It will require much time to acquire this discipline and learn these calisthenic exercises." I am not aware that any really good thing can be accomplished without the expenditure of considerable time and energy. But we must remember that the object of our school system is mental discipline, and what better lesson can be instilled into the young mind than prompt obedience and order in carrying out a command.

But my objector must remember, in addition to the mental discipline, that physical culture and relief to the monotony of the school hours are invaluable. I would therefore urge upon the teachers

whom I have the honour of addressing the importance of the practice of calisthenics in the school-room as well as in the play-ground. No child under ten years should be required to sit longer than fifteen minutes without a change involving decided physical exercise. The mere alteration from the sitting posture to the standing in the class is valueless. Nor should those over ten years of age be exempt from calisthenics even in the class-room. The slightest appearance of languor or weariness creeping over a class at any time should be an indication, not to be disregarded, that the class should be called up for calisthenics. I am persuaded, apart from the physical advantages to be derived from these exercises, more real, genuine, healthy mental labour can be performed; the gain is, therefore, both physical and mental. Why, then, is it that a subject of such vital importance is so sadly neglected? I believe there are two reasons. 1st. The amount of work crowded into the programme is so great that teachers require all the time at their disposal to overtake it. 2nd. It is not one of the subjects on that examination to which with fear and trembling they are looking forward. I cannot leave this branch of my subject without expressing the opinion that every teacher in the land should possess and study a small work on "Drill and Calisthenics," by Mr. Hughes, Public School Inspector, of Toronto. It contains not only military drill, but a multitude of different kinds of exercises, all admirably calculated to aid in the development of a graceful and sound physical organization. My time will only allow me to mention the important subject of ventilation.

The air passing out of the lungs each time we breathe is loaded with carbonic acid and other impurities. The 2,300,000 sweat pores opening upon the surface of the body pour out daily from one to two pints of fluid containing impurities, some of which escape into the air. From these two sources, the atmosphere of a room occupied by forty or fifty children soon becomes thoroughly contaminated, unless ample means are provided for ventilation. Pure air is absolutely necessary for the purification of the blood, and pure blood is essential to the proper nourishment of the organs of the body. If, therefore, the air is impure, the blood will be impure, and the brain badly nourished, and consequently unable to afford that nerve power necessary for clear, profitable thought. I can only stop to mention one simple means of ventilation which can be adopted in nine-tenths, perhaps all, of the public schools of the country, and it is quite efficient. The upper sashes of opposite windows are lowered, and if the window blinds are attached to the window frames, they must be removed and fastened to the upper rails of the sashes, so that they will not interfere with the free ingress and egress of the air. The judgment of the teacher must determine the size of the opening. The warmer and stiller the air, the larger they would be, and vice versa. I desire now to ask your attention to the mode of punishment adopted in our schools, and ascertain, if possible, whether it is the method best adapted to promote physical health or otherwise. Man always has been, is, and I suppose always will be, a creature of extremes. A half a century ago, and less, punishment was torture and cruelty. To be sentenced for six months to the horrid dungeons and cruelty of those days was almost equivalent to be sentenced to death. But Howard and other philanthropists grappled with the prison wrongs of that period, and the wave of amelioration which then commenced has swept over every civilized land, and now prisons are almost palaces, and all prison life means a loss of liberty. The same wave has unfortunately contaminated the ideas and practices of our teachers, and corporal punishment is completely abandoned, except in extreme cases. Unfortunate transgressors are sentenced to "stay in at intermission or after school is dismissed." The pupils are thus robbed of the fresh air and frolic of the intermission, and to the mental worry of study until the hour of intermission, is added the intensified worry of imprisonment in the vitiated air left by his companions, and without exercise, and without imbibing the pure external air, he must worry on until school is dismissed. Will any one say that these children have not been grossly wronged? Better far, especially for all the younger pupils, inflict corporal punishment, and give the offenders the fullest benefit of their scant opportunities to resuscitate their physical organizations. But my time is more than exhausted, and I must conclude. Teachers of this association, you have a work before you as far-reaching in its destiny as it is deep in importance. To you, in no small degree, is committed the problem of determining what shall be the physical and mental status of the generation that is to follow us. I urge you to realize fully the importance of your work, and to do your duty well.

SCHOOL ROOM HYGIENE.

SUBSTANCE OF AN ADDRESS AT THE NORTH YORK TEACHERS' ASSOCIATION, BY D. FOTHERINGHAM, P.S.I.

I begin by asking what ends should be kept in view in the erection of a school room. The first, and often the only end aimed at, is the *Intellectual Education* of our youth. That is a truly worthy aim, for we want, in the future, men and women, shrewd, clear headed, incisive, who shall be able to take in any situation at a glance, and decide the right course of action on short notice. But any trustee or community that shall stop here, and fail to recognize need for education other than *intellectual*, fails sadly in understanding the true necessities of the case. For a vigorous and successful career through life, our coming men and women must possess strong and healthy frames—their *Physical Education* should receive consideration scarcely secondary to *Intellectual*. The practical value of *Intellectual Power* is closely and inseparably dependent on *Physical Power*, and any provision for promoting the one without full attention to the other, is short-sighted and unwise. To be useful, to be successful in life, we must see that our young people shall possess a sound body as well as a sound mind. In the majority of cases, *Physical Education* is not once thought of, and no adequate provision is made for it in the construction and arrangements of our school rooms. Till this is done, justice is not done to the wonderful powers and possibilities of our compound being. Nay, more, the seeds of deformity and disease, are, too often, sown through the oversight and neglect of reasonable provision for the comfort and health of the body in the school room. See how careful a horse fancier is of the physical condition of his roadster, and how he seeks by every means to keep it in the best possible condition for use. Contrast with this our neglect of the physical training of children.

I venture to say further, that the *Social Education* of young people receives no sufficient consideration in the construction of school rooms. What enlightened and liberal provision is made, in the space and rooms of a School House, for natural movements and intercourse among the young people—for observing the proprieties, civilities and amenities of life—for developing and perfecting the knowledge and practice of true politeness and unselfish consideration of others?

But, above and beyond the *Intellectual*, *Physical*, and *Social*, we should make provision for the *Moral Education* of youth. And any provision for the future well-being and well-doing of our children should see to it that all strength shall be developed in *moral principles*. The school room should be arranged and its work conducted with direct and deliberate purpose to develop the virtues of truth, honesty, purity, justice, self-sacrifice, and the fear of God; and no one will deny that the child's surroundings do help or hinder in the formation of habits and character.

I claim, therefore, that in the construction of School houses regard should be had to:

- 1.—*Intellectual Education*.
- 2.—*Physical* “
- 3.—*Social* “
- 4.—*Moral* “

These departments of training are so closely allied and interlaced that the neglect of one must unfavorably influence all the others; and so I introduce my remarks on School Room Hygiene by calling attention to them. I now proceed to my subject proper:

The Hygiene of the School room is in no way so often and so seriously influenced unfavorably as by the state of

I. THE ATMOSPHERE.

1. *Its Quality* should be good. It will not do to have it good and bad alternately. To insure health and normal condition of mind and body, we must see that we have a normal condition of the air we breathe. One of the most frequent and most inexcusable mistakes of the school room is, to allow 40, 50, even 80, or 90 pairs of lungs, to use up the vitalizing oxygen, and load the atmosphere

with the poisonous exhalations of the body for half an hour, or an hour, without any intelligent effort to preserve the purity or remove the impurities of the air. Too often, even now, after ten years of earnest effort to secure pure air and clear minds in schools, do I enter rooms almost hermetically sealed, with fifty or sixty precious lives languishing in what might soon become another Black Hole—without arrangement of any kind for the regular and rapid escape of the fetid and used up, or admission of the pure and bracing. “What would I do if Trustees would not make arrangements for ventilation?” I would take a hammer and nails and suitable pieces of wood, and tear out and down and re-arrange tall windows could be easily opened at top and bottom. I would, at any cost, make it possible for myself and my children to breathe pure air at every inspiration, though this would give neither the best nor safest possible ventilation. Talk of cramming! talk of over home study! I dare assert that for one child that is injured by these, one hundred are enfeebled for life by the insane indifference of the general public, of school authorities, and even of some teachers, to the state of the school room air. Pure air has far more to do with good discipline, good progress and good health, than is generally realized.

Before leaving this point, I would call attention to the importance of selecting school sites in localities free from malarial influences, where good drainage can be secured. Too often these points are sacrificed to meet a desire to have a school in the territorial centre.

2. *Its Quantity*.—You cannot have too much good air. The only limit I would set to the space allowed in the school-room would be ability properly to regulate the temperature. The legal requirement, 120 cubic feet for each of two-thirds of the school population, is a niggardly pittance of the great ocean with which we are surrounded so bountifully, so mercifully. Think of the rapidity with which fifty persons, breathing fifteen times a minute, and two pints at one breath, will destroy the purity and vitiate the atmosphere of an ordinary school-room. For it is not the whole air that vitalizes. The oxygen constitutes but one-fifth of the whole volume of air, and that alone gives support to life. While this is consumed so rapidly it is replaced as fast by gases and vapors from the system, which, if breathed again, speedily stupefy and poison. In ordinary circumstances, the higher ceilings are the better, as most of the gases and vapors, on escaping from the body, ascend, though one of the most poisonous—carbonic acid gas—sinks; and this leads me to speak of

3. *Its Circulation*.—Still air soon becomes bad. Nature seldom allows the air to rest. Breezes, winds, gales, give constant change and purity to the atmosphere outside, while with our ceiled houses and closed windows and doors, the bracing purity and rapid change are excluded, and the inside becomes a stagnant pool of fetid air. Let a room without occupants be closed for a short time, and we cannot breathe the air it contains with comfort; but shut in it fifty people, and set a fire going to consume its quota, too, of the oxygen, and a few minutes are sufficient to destroy its life-sustaining properties. It is thus evident that the air of a school-room should be kept in constant circulation. Bad air should be driven out by the inflow of good air moment by moment. It is not sufficient to make periodic changes. Teachers and scholars often forget to do that. Arrangement should be made for a supply equal to the demand, which has been shown to be constant and great. How to do so is a difficult problem. Draughts must be avoided. Violent changes of temperature must not be permitted. To secure good air without these frequent attendants, requires both great skill and considerable expense. In my opinion, furnaces with sufficient capacity, supplied with outside, fresh air, throwing in a constant supply of this heated (not scorched) air, with proper ventilation at the ceiling and floor for the escape of impure air, is within the reach of all School Sections. And then the pernicious method of heating the already impure air by stoves would be done away. Ventilation by the tops and bottoms of windows is much better than none; but there is this serious objection to it in severe weather, those seated near such openings are subjected to draughts and chills, while those in other parts of the room do not get much benefit from the change. There is this objection also, the heated air escapes too readily by the open windows, while the cold air falling, as it always does, to the floor, keeps the feet in too low a temperature. However, till you are provided with better means of ventilation, keep rousing fires and open windows, so as to insure rapid change of air. When I have advised Trustees to construct furnaces while erecting houses, so that the pure air could be heated and thrown steadily into the school-room, the matter of health was not for a moment considered. The question was, Would it cost more? and, as undoubtedly it would,

the decision was in favor of the time-honored "Black Giant." A hundred dollars or so extra could not be thought of, to make sure that the young people should have good air, good health, good nature and good work, even though the S. S. would not have to pay on an average one dollar more on \$1,500 of assessed value. This false economy, growing out of ignorance of the laws of hygiene, must ultimately give place to wise and liberal provision for giving good air to the schools.

4. *Its Temperature.*—The temperature of the School-room has much to do with its success and comfort. In fixing the degree of temperature, several matters should be considered:—the flow of air into and out of the room, the quantity of air, the restoration of the children, their clothing, the state of their health, their proximity or remoteness from the stove, &c., &c. You cannot lay down any arbitrary rule. The teacher, who is, or should be constantly moving, and is usually in a more elevated position, can be comfortable in a lower temperature than children sitting at their desks. Then, too, some are thinly clad, and poorly fed, and some are delicate; so that you should consider what is best for the whole, and not risky for any. I should say a temperature of about 70 degrees where a thermometer is usually hung—behind the teacher—would not be much out of the way, especially if the house is a comfortable one. But when your house is cold, and stands on cedar posts, without banking, you cannot make the temperature what it should be: and, if your children suffer from cold feet, let them go to the stove to warm them, even if they do not study half time. It is worse than cruelty to compel them to inhabit such a house winter after winter. If you are obliged to heat your stove like a smelting furnace in such a house, have screens to set around the stove, to protect those who must sit near it. Many a child has been made ill by this half roasting, half freezing process.

Next to the atmosphere, one of the most potent influences affecting school-room hygiene is

II. LIGHT.

The influence of light on the health is largely overlooked. Yet its silent, gentle, constant power, is vastly important. Plants soon languish and die without it, and animals deprived of it lose sight and health, and even life. Much attention should be given in the school-room to

1. *Its Color.*—Pure, prismatic colors, in the right proportion, should always be secured. The light admitted through frosted or stained glass is usually deprived of some of its constituents, and distresses the eye, and injures the health to some extent. That transmitted through orange or yellow Holland is still worse. It is so far robbed of its proportions and properties as to be very uncomfortable. Reflected light, too, is often very much impaired. The surface of walls, ceilings, &c., should be of such a color as to soften and harmonize shades of light. Where the direct rays have to be shut out, green or blue shades are preferable even to white.

2. *Its Intensity.*—Men can labor out doors in the direct rays of the sun, without distress, if the eyes are shaded, when children and other students, who are poring over marks and characters at a small distance, suffer readily from excess of light. The reason is not far to seek. Out of doors the eyes are constantly bathed in fresh air, the focus is seldom the same for more than a few moments, and there is relief in variety of shades and objects; while with the student this is all reversed. The light is the same, the focus is the same, and there is no variety. The monotony of effort, of color, of focus, of object, taxes to injury very quickly. The light of the school-room should therefore be sufficient, but softened, and even subdued, to meet the change of circumstances under which the eye is used. Black slates and white paper are objectionable. Nature's prevailing shades should be copied in the materials on which the eye has to gaze with steady and trying intensity. In this way variety and harmony would relieve the unavoidable taxation.

3. *Its Direction.*—Little "at your own observation may not suggest can be said on this point, which, however, is not unimportant. The direct or reflected light which strikes directly into the eye, is always to be avoided. Light should be admitted so as to enable the pupils to see their work clearly and readily. It should come from a direction not to throw shadows which interfere with vision, nor to oblige the eyes to squint or strain after their work. In this connection, let me urge upon you the great evil that is so often done to the eyes by allowing them to squint, or look awry at work, and by permitting the face to approach within a few inches of the book in use. Train to proper attitude and the proper focus, considering cases of myopia, or the reverse.

In the last place I speak of

III. ACCOMMODATION.

1. *Accommodation for Study.*—This should be removed as far as possible from the place for recitation. It should be convenient, so that work could be taken or replaced without trouble or noise. It should be comfortable, so that the body, as well as the mind, may rest naturally and at ease. It is too late in the day to ignore physical comfort to children. Matured persons can far better endure physical discomfort than immature ones, in the early stages of development, when bones, muscles, and nerves, are less capable of strain. Yet, in three out of four cases, the effects of even the improved desks and seats on the young people, are seriously hurtful. What is more fatiguing for a child than to sit for hours with its feet dangling in the air, throwing the spine out of its natural curve, and crowding the lungs, wearying the muscles that must support the weight of the lower limbs, and curving the soft thigh bones? How few of your children are of the size to take advantage of their chairs, which are far better adapted for giving a finish to their looks than support to the weary spine of the growing, tired boy or girl? Why should not the seats be graded in height so as to allow the feet to rest comfortably on the floor? Why should not the chairs brace the seat and back so as to support and preserve the natural postures and curves of the body? Why should not the desks be so sized and shaped as to hold the work at a comfortable and natural distance before their occupants? Look over your children at a writing exercise, and count how many of them look like star-fish on the back of an oyster; and all because the seats and desks are not suitable for them. If you have any penitent stools in the shape of for us without backs, at least cut off the feet till the top is within ten inches of the floor, and set them along the wall. If you do not you will be responsible for round shoulders, hollow chests, and enfeebled frames, to a serious extent.

2. *Accommodation for Recitation.*—In Schools not graded thoroughly, hearing of lessons and teaching interfere very seriously with the quiet and work of the school-room. In such schools of the future, I hope to see a separate room for recitation, with glass doors between that and the study room, (which may be thrown open when not in use), into which the teacher and class will retire. If the future boy and girl are as irreplaceable as some are now, a monitor can be left in charge. In this way there will not only be less interruption of work, but more air space; and, in addition, there should be comfortable seats, rests for books, &c., so that the fatiguing practice of standing still for half an hour may not be a necessity. When a class-room is not provided, seats between the teacher's desk and those of the children may be used, though health may suggest standing sometimes instead of sitting. In either posture, insist upon natural attitudes. Much harm is done to the powers of developments, as well as to the grace and ease of the human form, by neglecting this point. Who ever heard of compelling soldiers to stand half an hour "Heels together, toes out!" or hands pinched behind or at sides? These awkward and tiresome postures are as inconsistent with health as they are with grace of figure or motion. Study the simple laws of "Action," as laid down in any work on elocution, and you will find that they take hold of the graceful and expressive laws of a healthy and well developed physical frame, and make them contribute to the power of vocal language. Let the right hand and foot be at "At ease," the shoulders thrown back, the organs of speech free to move by holding the head erect, and the eyes taxed by neither too great nor too short a distance from their work.

3. *Accommodation for Recreation, Lunch, Rest, &c.*—Not only would it add to the comfort of a school-house to possess such a room; but it would also be healthful, and prevent damage to furniture. Basements or second floors could readily be fitted and heated for such purposes. The children would not be tempted to disobey orders, by making the school-room proper a play or lunch room. In disagreeable weather, physical exercise, exhilarating games, songs, drill, &c., could be secured. Without such accommodation, in bad weather, as matters now are, how the buoyancy, the activity, the good humor of children must be repressed! and how the inventive but restless spirits will involve themselves, the teacher, and sometimes the whole school in trouble.

Thus, hurriedly and imperfectly, have I tried to lay before you seed thoughts on a subject to which very small justice has as yet been done, but to which, if children are to be educated aright, must ever increasing importance be attached—School-room Hygiene.

General Information.

MORTALITY IN DIFFERENT PURSUITS.—The reports of the British Registrars-General show that the annual death-rate in the United Kingdom is about one in forty-five of the entire population. The larger, but not the largest towns, lead in the rate of mortality, and the rural mainland districts occupy an intermediate place between them and the insular districts, the extremes varying by about fifty per cent. As between the three great classes into which the population may be divided—the laboring, the trading and professional classes, and the gentry and titled—the chances are very nearly equal, although a slight advantage appears to be shown in favor of the first class. The trades most unfavorable to long life are, as a rule, those which tend to expose the operative to an atmosphere loaded with dust, or compel him to deal in one way or another with poisons. Dry grinding, as practiced on needles and forks at Sheffield, is the worst; working in coal-mines is the next in deadliness. Gilders and silverers of glass are exposed to vapors of mercury; workers in brass are liable to diseases produced by exposure to volatilized oxide of lead; all who work in paints are subject to great risks; soldiers and sailors have their lives shortened by the exposure they have to undergo, or by diseases brought on by their habits of living. Bakers, tailors, milliners are liable to consumption; compositors peculiarly so. Pressmen fare better than compositors, probably because their work is more active. In the country, farming appears to be the most healthy of occupations, while that of the innkeeper is the most fatal. Butchers die comparatively early, as also do brewers, draymen, and those who have much to do with establishments for eating and drinking. The over-exertion of those who follow athletic pursuits appears to conduce quite as much to short life as does the sedentary strain of the student. It seems to make but little difference in the "expectation of life" of in-door workers whether their labor is hard or not; but those who are employed out-of-doors have a chance of living six years longer, if their work keeps them busy and active, than if it is a mere matter of routine and standing around; and a "comparison of the tables leads us to the conclusion that the life of the out-door worker with little exercise is worse than that of the sedentary in-door worker, whether with little or with great exercise." The most curious fact brought out is that the scavengers, dustmen, and cleaners of sewers in London, are reckoned among the healthiest of the population.

PARASITES IN FOOD AND DRINK.—M. Milne-Edwards has recently expressed some interesting views suggested by the discussions concerning trichina, respecting the hygienic questions which are connected with the establishment of colonies of intestinal worms, or *microbes*, within human bodies. He believes that certain religious precepts and certain established usages, among people whose civilization is very ancient, are based upon acquaintance with the inconveniences that may result from the alimentary use of particular meats or waters. He thus deduces, from the aptitude of the hog to transmit his parasites to man, the reason for the prohibition of pork among the Israelites and Mohammedans, and for the Biblical distinction between pure and impure animals. He also attributes to the very ancient recognition of analogous facts the general use of hot drinks, like tea in China and other countries of the extreme East, where the natural waters are often charged with noxious animalcules or polluted by unclean animals. As bearing on this point, he cites the ravages caused in Cochinchina by a microscopic eel, which produces a persistent endemic diarrhoea. These animals have a faculty of multiplication in the human intestine, that is illustrated by the fact that a single patient is said to have evacuated more than a hundred thousand of them within twenty-four hours! The simplest prudence should suggest the expediency of boiling the drinking-water wherever they abound.

ORIGIN OF THANKSGIVING DAY.—The story is told that in a time of great despondency among the first settlers of New England it was proposed in one of their public assemblies to proclaim a fast. An old farmer arose and spoke of their provoking heaven with their

complaints; he reviewed their mercies—showed they had much to be thankful for, and moved that instead of appointing a day of fasting, they should appoint a day of thanksgiving. The incident teaches that true piety in all circumstances finds something to be thankful for. The old farmer acted upon the theory that our Heavenly Father does not take pleasure in seeing his children suffer, and that we cannot please Him by starving ourselves. "Ye are my friends if ye do whatsoever I command you." This custom of proclaiming a public thanksgiving day continued a New England custom, at first at irregular intervals, afterwards annually till 1862, when President Lincoln proclaimed a national thanksgiving day. Since that it has been observed annually; but not until within a comparatively few years has the day been generally observed outside of New England. In the East this is the day of all the year for family reunions and neighborly meetings and greetings. The custom is a beautiful one, and should be universally observed. The fourth Thursday in November should be one of the brightest days of the year.

SLEEP.—There is no fact more clearly established in the physiology of man than this, that the brain expends its energies and itself during the hours of wakefulness, and that these are recuperated during sleep; if the recuperation does not equal the expenditure, the brain withers; this is insanity. Thus it is that in early English history, persons who were condemned to death by being prevented from sleeping, always died raving maniacs; thus it is also that those who are starved to death become insane; the brain is not nourished and they cannot sleep. The practical inferences are three:—Those who think most, who do the most work, require the most sleep; that time "saved" from necessary sleep is infallibly destructive to mind, body, and estate. Give yourself, your children, your servants, give all who are under you the fullest amount of sleep they will take by compelling them to go to bed at some regular early hour, and to rise in the morning the moment they awake of themselves, and within a fortnight, nature, with almost the regularity of the rising sun, will unloose the bonds of sleep the moment enough repose has been secured for the wants of the system. This is the only safe and sufficient rule, and as to the question how much sleep any one requires, each must be a rule for himself; great nature will never fail to write it out to the observer, under the regulations just given.

BANK OF ENGLAND NOTES.—Bank of England notes are made from pure white linen cuttings only, never from rags that have been worn. So carefully is the paper prepared that even the number of dips into the pulp made by each individual workman is registered on a dial by machinery, and the sheets are carefully counted and booked to each person through whose hands they pass. The printing is done by a most curious process within the bank building. There is an elaborate arrangement for securing that no notes shall be exactly like any other in existence; consequently there never has been a duplicate bank note except by forgery. The stock of paid notes for seven years is said to amount to 94,000,000 and to fill 10,000 boxes, which, if placed side by side, would cover over three miles in extent.—Stationer and Printer.

IN JAPAN the spiders are so numerous that their webs form the chief draw-back to telegraphy by grounding the electric current. The trees literally swarm with spiders, and they spin their webs everywhere between the earth, wires, posts, and insulators. When these lines are covered with heavy dews, they become good conductors, and run the messages "into the ground." The telegraph company are obliged to employ men to sweep the wires with bamboo brushes, but the spiders are so numerous, and such indefatigable workers, that the men with their brushes cannot always keep the wires in good condition for the transmission of messages.

THE BLUE SKY.—M. Chappius thinks that the blue of the sky may be due to ozone present in the upper regions of the air. He argues that the electrical discharges constantly taking place will produce ozone; and the researches of himself and M. Hautefuille have shown that ozone, at any rate when near its condensation point, is of a blue tint. He has examined the absorption spectrum of ozone and finds nine dark bands in it, three at least of which correspond with known bands in the telluric spectrum.

Mathematical Department.

JUNIOR MATRICULATION, JUNE, 1881

UNIVERSITY OF TORONTO.

PASS MATHEMATICS.

Examiner: A. K. BLACKADAR, B.A.

1. Simplify

$$\frac{8}{3} - \frac{45}{8} \left(\frac{16}{25} - 1 \right) + \frac{1}{2} \frac{(64 - 1) \times 390625}{11 \left(\frac{1}{3} + \frac{1}{2} \right)}$$

2. Find the square root of 5 to five decimal places, and reduce the values of

$$\frac{1}{\sqrt{5}}, \sqrt{.002}, \frac{5 + \sqrt{5}}{5 - \sqrt{5}}, \text{ and } \sqrt{6 + 2\sqrt{5}}$$

3. (a) How much will \$1000 amount in 2½ years, compound interest, 4 per cent. per annum, payable half-yearly?

(b) A person pays \$292.50 for \$300 due three months hence. What rate per cent. interest does he receive?

4. What is meant by the expression, "Sterling Exchange, 9½ p. c. premium"?

A person pays \$181.50 for £37: 10s., stg. What per cent. premium is Sterling Exchange?

5. Multiply $b^2 + (a-b)(b-c)$ by $c^2 + (b-c)(c-a)$. Show that your answer is correct by substituting $a=2, b=0, c=-3$.

6. Simplify

$$(1) \frac{a^2b - c^2}{a - b^2c - c^2}$$

$$(2) \frac{x^2 - 2 + x^{-2}}{x^2 - x^{-2}} \cdot x^2 + 1$$

7. Resolve into factors.

$$a^2 - b^2, ab + bc + ca + b^2,$$

$$a(b+c)^2 + b(c+a)^2 + c(a+b)^2 - 4abc,$$

$$(a+b)^2 - 2b \frac{a^2 - b^2}{a - b} + c(a^2 - b^2) - 2ab^2.$$

Find the Greatest Common Measure, and the Least Common Multiple of these four quantities.

8. Solve the equations

(1) $ax + b = bx + a$.

(2) $\frac{1}{x^2 + 3x + 2} + \frac{1}{x^2 + 5x + 6} = \frac{1}{x^2 + x + 2}$.

(3) $\begin{cases} \frac{2}{x} - \frac{3}{y} = 4 \\ 2x - 3y = 2xy. \end{cases}$

(4) $\begin{cases} xy - yz = 18 \\ x^2 + z^2 = 4y^2 + 2xz \\ x^2 - 8 = 2xy + 2xz. \end{cases}$

9. There are two vessels, A and B, each containing a mixture of water and wine, A in the ratio of 2:3, B in the ratio of 3:7. What quantity must be taken from each in order to form a third mixture which shall contain 5 gallons of water and 11 of wine?

10. Describe a triangle, of which the sides shall be equal to three given straight lines, any two of which are together greater than the third.

A straight line AD is divided into three equal parts by the points B and C; on AB, BC, CD are described equilateral triangles AEB, BFC, CGD respectively; shew that the three straight lines AE, AF, AG, can form a triangle equal in area to the equilateral triangle A.

11. Divide a given straight line into two parts, so that the rectangle contained by the whole and one of the parts shall be equal to the square on the other part.

12. Define the terms, circle, tangent to a circle, and segment of a circle.

The angles in the same segment of a circle are equal to one another.

SOLUTIONS.

1. Expression = $\frac{6}{25} - \frac{45}{8} \left(\frac{16}{25} - 1 \right) + \frac{54}{5} \times \frac{4}{5} \left(\frac{16}{25} - \frac{1}{9} \right) \frac{25}{64}$

$$= \frac{6}{25} - \frac{45}{8} \times \frac{17}{15} + \frac{7}{15} + \frac{27}{8} \times \frac{17}{15} \times \frac{7}{15}$$

$$= \frac{6}{25} - \frac{9}{4} \times \frac{119}{225} = \frac{6}{25} - \frac{119}{100} = -\frac{95}{100}$$

2. See Hamblin Smith's Alg., p. 315. and Hamblin Smith's Arith. App. I. (Can. Ed.)

We use the Binomial Theorem for larger numbers and the latter method for small numbers.

We see by inspection, ordinary method $\sqrt{5} = 2.2 +$

Substitute 5 for N and 2.2 for a in the formula

$$\sqrt{N} = a \frac{3N + a^2}{N + 3a^2} \text{ and } \sqrt{5} = 2.2 \times \frac{15 + 4.84}{5 + 3(4.84)} = \frac{1.1 \times 1.24}{.61} = 2.23606.$$

N.B.—The general formula is

$$\sqrt{N} = a \frac{(n+1)N + (n-1)a^2}{(n-1)N + (n+1)a^2} \text{ approximately.}$$

$$\frac{1}{\sqrt{5}} = \frac{1}{5} \sqrt{5} = .44721$$

$$\sqrt{.002} = \frac{1}{10} \cdot \frac{1}{\sqrt{5}} = .044721$$

$$\frac{5 + \sqrt{5}}{5 - \sqrt{5}} = \frac{(5 + \sqrt{5})(5 + \sqrt{5})}{(5 - \sqrt{5})(5 + \sqrt{5})} = \frac{1}{2}(3 + \sqrt{5}) = \frac{1}{2} \times 5.23606 = 2.61803$$

$\sqrt{6 + 2\sqrt{5}} = \sqrt{x} + \sqrt{y}$. See H. Smith's Alg., p. 226, theorem II.

$$\therefore 6 = x + y \text{ and } 2\sqrt{5} = 2\sqrt{xy}$$

$$36 = x^2 + 4xy + y^2 \text{ and } 20 = 4xy$$

$$\therefore 16 = x^2 - 2xy + y^2 \text{ or } \pm 4 = x - y$$

$$\therefore \sqrt{x} + \sqrt{y} = 1 + \sqrt{5} = 2.23606.$$

3. (a) Taking 4% per annum = 2% half-yearly.

$$A = 1000 \left(1 + \frac{2}{100} \right)^5$$

$$= 1000 \left\{ 1 + 5 \left(\frac{2}{100} \right) + 10 \left(\frac{2}{100} \right)^2 + 10 \left(\frac{2}{100} \right)^3 + \text{etc.} \right\}$$

$$= 1000 \left\{ 1 + .1 + .004 + .00008 + \text{etc.} \right\}$$

$$= 1000 \times 1.10408 = \$1104.08.$$

(b) Discount = $\frac{7\frac{1}{2}}{300}$ debt = $\frac{1}{40}$ ∴ interest = $\frac{1}{39}$ per quarter

$$= \frac{4}{39} = 10.25\% \text{ per annum.}$$

N.B.—When interest = $\left(\frac{a}{b} \right)$ principal, disc't = $\frac{a}{a+b}$ (debt).

See McLellan's Exam. Papers, p. 220, and Key.

4. Book-work.

$$£37\frac{1}{2} \times \frac{40}{9} \times \frac{x}{100} = \$181\frac{1}{2}$$

$$\therefore x = 108\frac{9}{10} \text{ premium.}$$

5. Expression $\{bc + a(b-c)\} \{bc - a(b-c)\} = b^2c^2 - a^2(b-c)^2$
and $-36 = -36$.

6. (2) Expression = $\frac{x^4 - 2x^2 + 1}{x^4 - 1} - \frac{x^2}{x^2 + 1}$

$$= \frac{x^2 - 1}{x^2 + 1} - \frac{x^2}{x^2 + 1} = -\frac{1}{x^2 + 1}$$

7. $(a+b)(a-b)$
 $(a+b)(b+c)$ are the factors of the first two expressions

2nd Exp. = $a(b-c)^2 + b(c+a)^2 + c(a+b)^2 = (a+b)(b+c)(c+a)$.

3rd Exp. = $(a+b)^2 - 2b(a+b)^2 + c(a^2 - b^2)$
= $(a+b) \{ (a^2 - b^2) + c(a-b) \} = (a+b)(a-b)(a+b+c)$

∴ G.C.M. = $(a+b)$ and L.C.M. = $(a+b)(b+c)(c+a)(a-b)(a+b+c)$.

8. (1) $x = 1$.

(2) $\frac{1}{(x+3)(x+2)} + \frac{1}{(x+1)(x+2)} - \frac{1}{(x+2)(x-1)} = 0$

Divide through by $x+2$ ∴ $x = -2$,
also $x^2 - 2x + 7 = 0$, whence $x = 1 \pm 2\sqrt{3}$.

$$(3) \frac{2}{x} - \frac{3}{y} = 4, \text{ and } -\frac{3}{x} + \frac{2}{y} = 2$$

$$\therefore \frac{2}{x} + \frac{2}{y} = -1 - 12 \text{ etc. } \therefore x = -\frac{5}{14}, y = -\frac{5}{16}$$

$x=y=0$ are the other two roots.

$$(4) y(x-z)=18 \quad \therefore x-z=\frac{18}{y}$$

$$(x-z)^2=4y^2 \quad \therefore x-z=\pm 2y \quad \therefore y=\pm 3$$

$$\therefore x-z=\pm 6 \text{ and } x=z\pm 6.$$

From 3rd and 2nd $z^2+8=4y^2-2xy$, substituting for x and y we get the value of x and y .

9. A contains $\frac{2}{5}$ water and $\frac{3}{5}$ wine; B $\frac{3}{10}$ water, $\frac{7}{10}$ wine.

Let x and y = quantities drawn from A and B respectively.

$$\therefore \frac{2}{5}x + \frac{3}{10}y = 5, \quad \frac{3}{5}x + \frac{7}{10}y = 11$$

whence $x=2, y=14$.

10. Join FG , then $FG=BC=AE$. And AFG is the \triangle formed by AE, AF, AG , and it is $= \triangle FGC = \triangle AEB$.

Examination Questions.

PROMOTION EXAMINATIONS—NOVEMBER, 1881

COUNTY OF LINCOLN.

2ND CLASS TO JUNIOR THIRD.

ARITHMETIC.

Time—1½ hours.

1. Write in figures:—Seventy thousand and sixty-two; four hundred thousand five hundred and eight; forty-seven thousand four hundred and seventeen, and two hundred thousand and twenty-five.

2. A man sold a house for \$6,248, a carriage for \$175, seven tons of hay at \$14 a ton; how much money does he receive?

3. If a boy earn 75 cents every day and spend 47 cents, how much money will he have at the end of 365 days?

4. A man sells his butter at the market for 237 cents, his eggs for 175 cents, his apples for 437 cents, his potatoes for 770 cents and his chickens for 58 cents; he then spends 1287 cents of his money for clothes; how much has he left?

5. Work the following correctly:— $439+17+4850+68+336+5500+772+8$; also $43500-991$, and 4050×4050 .

Value—Ten marks for each, and ten marks additional for neat work.

SPELLING.

Time—1 hour.

- Very busy planting roots, fruits, flowers.
- Laughing, crying, quite afraid.
- A great deal to learn to wear clothes.
- He asked in shrill, piercing tones for a piece of meat.
- The county of Norfolk in England.
- In a dreadful rage he tried to seize Willie.
- Sugar plums, a guard chain and some new music.
- He managed to crawl easily, slowly and steadily.
- Opening the door she saw a bird with soft, yellow feathers.
- Enemies and friends happened to meet together.
- She snipped off ribbon enough with her mother's scissors.
- They buried him for he was dead already.
- Ascending and descending the tall chimney.
- She never lost her presence of mind.
- He walked off coolly and leisurely.
- He attracted his attention, fully believing in his power.
- The weight of his soaked clothes completed his distress.
- Men imagine they hide their thoughts, but God knows them.
- He was touched at a scene of such emotion and pleasure.
- In fifteen minutes they separated on their several errands.
- A wearisome job for robust, healthy boys.
- He threw off his clothes, jumped in and saved him.
- A small country village near the wonderful city of London.

Value—50; 2 marks off for each mistake in spelling or use of capitals. Pupils will write but once, and the teacher will dictate slowly and distinctly.

READING.

Value—50; 35 marks being given for correct reading, and 15 for a reproduction in the pupil's own words, of the lesson on "The Best Fun," no previous preparation being allowed.

WRITING—Value, 30.

The teacher will cut off the papers in each subject as they are needed.

JUNIOR THIRD TO SENIOR THIRD CLASS.

SPELLING.

(Not to be seen by pupils.)

Time—40 minutes.

- Nothing but repulses, accompanied by abuse.
- Two mattresses and an earthen pitcher of vinegar.
- His gratitude guessed her taste in an elegant basket.
- He could scarcely keep his countenance during the harangue.
- The marvellous work of art made a great sensation.
- To my despair, the light suddenly disappeared.
- An immense ocean covered with innumerable islands.
- Tell me what I ate this morning for breakfast.
- They seized him and clipped off both his ears.
- So famed for his talent in nicely discerning.
- The opportunity of pursuing a liberal course of study.
- Tumbling and peeling the skin off their shins and knuckles.
- Completely deceived and unconscious of their situation.
- He conceived a new and original method.
- The spectators rewarded him liberally.
- Segacity, docility, benevolence, fidelity and attachment are qualities in the dog.
- Nearly immersed and unable to extricate itself.
- The final suppression of the Scottish rebellion.
- He fought separately for some minutes on the opposite side.
- Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.

Value—50; 2 marks off for each mistake. Pupils to write but once; teachers to read slowly and distinctly.

READING.

Value—50; 35 marks for correct reading, 15 for a good reproduction in pupil's own language of the lesson on "Brave John Maynard."

WRITING—Value, 40.

GRAMMAR.

Time—1 hour.

1. What part of speech is each word in the following passage: (The word *the* not counted.)

He made his arrangements in the night and began very early the next day. He instructed the laborers and they came at four o'clock in the morning. They set to work and the thing was soon done.

2. Write six sentences and draw a line under that part of each that is called the predicate.

3. Write a description of your school-house. Try to fill ten lines of your paper with it.

Value—1, 32; 2, 12; 3, 16; ten remarks additional for neat paper. Value of last question includes spelling, correctness and general fitness of language.

GEOGRAPHY.

Time—1½ hours.

- Give the boundaries of the township you live in.
- Name the province you live in, and name separately the other provinces of Canada, showing which lie east and which west of your own.
- Name the land lying east of the Pacific Ocean, and that lying west; through what must you pass in sailing from the Pacific into the Arctic Ocean?

4. Name six peninsulas in Europe and name the waters that surround them.
5. Name three large rivers in each of the continents of North America, South America, Asia and Africa, and name the waters each river flows into.
Value—1, 6; 2, 1+7+5; 3, 4+4+2; 4, 6+12; 5, 24. Ten marks to be deducted for lack of neatness.

ARITHMETIC.

Time—2 hours.

1. Write in figures six hundred millions four thousand two hundred and fifty-eight, and forty millions twenty-eight thousand and nine.
2. How many times can you subtract 1,482 from 25,574?
3. By dividing 42 into a certain number I got a quotient of 375 and a remainder of 16; into what number did I divide?
4. A man sold 46 head of cattle at \$33 a head and 25 horses at \$135 each; he paid \$3,500 of the money for a house, and with the rest bought flour at \$6 a barrel; how many barrels did he buy?
5. How many dozen of eggs at 12 cents a dozen must be given for 4 boxes of raisins, each containing 15 pounds, at 15 cents a pound? Give the reason for every step in the foregoing question, either on the blackboard or on paper.
6. Multiply 400,620 by 400,620.
7. A man has 3 ten dollar bills, 7 fives, 9 fours, 14 twos and 36 one dollar bills. He pays \$75 for board and pays for 13 sheep at \$4 each; how much money has he left?
Value—10 each; ten marks additional for neat work. Full work required.
The teacher will cut off the papers in each subject as they are needed.

THIRD TO FOURTH CLASS.

SPELLING.

(Not to be seen by pupils.)

1. The scene of an Indian legend.
2. They were drawn irresistibly into the smooth, treacherous current.
3. Through vigorous exertion they might reach the bank, though perilously near the cataract.
4. They purchased a cheese-toaster, a saucepan and a green baize curtain.
5. The Indian had some superstitious, heathen notion.
6. The excitement seemed to give new energy to his sinews.
7. They related the catastrophe of their pilgrimage.
8. A complete bridge is made in January or the beginning of February.
9. Frantic gesture appealing for aid.
10. As he rightly conjectured, they were totally unconscious.
11. Commemorate the heroism of Captain Baker, who sacrificed his life.
12. Having previously reloaded my double barrelled gun.
13. Their teeth glistening and their eyes glittering.
14. The men yawned and stretched themselves violently.
15. A determination which she resolutely maintained.
16. With fiery valor they vigorously attacked their assailants.
17. Triumphant yet dignified expression on the Governor's countenance.
18. The most interesting feature of the exciting scene.
19. Threats, imprisonment, scourge and chain.
20. An illustration of a wise and merciful arrangement.
Value—50; two marks off for each mistake.

READING.

Value—50; according to pronunciation, fluency and expression.

WRITING—Value, 40.

GRAMMAR AND COMPOSITION.

Time—2 hours.

1. In the following sentences show the subject, the predicate and the modifiers of the subject, each one separately:
Herbert's quick eye soon caught sight of him.
Now commenced an exciting race for the prize.
On the first of the month there was a heavy rain.

Saul of Tarsus, the apostle of the Gentiles, was also called Paul.

2. Parse: On such a night the sea engulfed my father's lifeless form.
3. Change the following nouns to the plural form:
A boy's fault.
A man's hat.
The deer's horn.
The church's duty.
4. Combine the following into a continuous passage:
Sugar is a sweet substance.
It is used largely for food.
It is obtained from the juice of a plant.
This plant grows in the West Indies.
It grows to a height of ten or twelve feet.
It is called sugar cane.
5. Improve the following: A waggon has 4 wheels and they are made of wood. You can ride in a waggon.
Value—1, 12; 2, 18; 3, 8; 4, 12; 5, 10; ten marks additional for neat paper.

GEOGRAPHY.

Time—1 hour.

1. Name the capes along the east coast of America, beginning at Cape Horn. No mark unless given in the order required.
2. What and where are Vancouver, Bell Isle, Saskatchewan, Lima, Fundy, Dover, Crimea, Appenines, Indus, Himalaya.
3. What products are obtained from the following countries: China, Hindostan, Russia, Italy, Brazil, Ontario.
4. Name the water a ship must sail through in touching at the following places: Toronto, Kingston, Quebec, St. John, Nfld., London, Eng., St. Petersburg.
5. Tell what you know of the Dominion of Canada in regard to—
(1) Its position;
(2) Its provinces;
(3) Its cities;
(4) Its rivers;
(5) Its lakes.
Value—1, 6; 2, 20; 3, 12; 4, 15; 5, 17; ten marks additional for neatness.

ARITHMETIC.

Time—2 hours.

1. What will it cost to ditch a road a quarter of a mile long, at 40 cents a rod?
2. If there are 42,438 acres in Clinton township and 47,496 acres in Gainsboro', how many square miles in both townships?
3. How many yards of cloth, worth 5 shillings a yard, can be bought for £40, 10s., 6d.?
4. Bought 6 bush., 2 pecks, 1 qt. of wheat for \$25.20, and sold 3 bushels, 3 pecks, 2 quarts for \$7.60; what shall I sell each quart of the rest for so as to lose nothing?
5. A farmer bought 17 acres, 2 roods, 35 sq. rods, 25 sq. yards of land from one man, and 10 acres, 1 rood, 20 sq. rods from another; he then sold 15 acres, 2 roods, 17 sq. rods, 29 sq. yards to a neighbor; how much land has he left?
6. Give three numbers that are measures of 12; also give three numbers that are multiples. Give a common measure of 8 and 12; also a common multiple.
Value—1, 10; 2, 10; 3, 10; 4, 15; 5, 15; 6, 10; ten marks additional for neat work. Full work required.

FOURTH TO FIFTH CLASS.

GRAMMAR AND COMPOSITION.

Time—two Hours.

Fourth Book page 140, from "He seized the person of the king," to "ill prepared for a fresh campaign."

1. Write out each proposition separately, stating its kind and relation.
2. Write a separate list of each kind of phrase in the passage, stating its kind and relation.
3. Analyze: *Cruelties, of which he had set the example, were carried to so extravagant an extent as to drive the Mexicans into revolt.*
4. Parse the italicised words.
5. Change the following into well constructed sentences, forming a continuous narrative:

Tea is the dried leaf of a shrub. This shrub grows chiefly in China and Japan. It is an evergreen. It grows to the height of from four to six feet. It bears beautiful white flowers. These flowers resemble white roses. In China there are many tea farms. These farms are generally of small extent. They are situated in the upper valleys. They are situated on the sloping sides of the hills. In these places the soil is light. It is rich. It is well drained. The plants are raised from seed. They are generally allowed to remain three years in the ground. A crop of leaves is then taken from them. The leaves are picked carefully by the hand.

Six marks additional for neatness. In the last question, note is to be taken of spelling, punctuation, grammar and harmony of construction.

Values—1, 10; 2, 10; 3, 12; 4, 12; 5, 20.

GEOGRAPHY.

Time—one Hour.

What are the chief exports of the following countries: Norway and Sweden, South Australia, Peru, Southern States, Manitoba, Hindostan, England, France?

2. Name all the islands and cities you know that are crossed by the equator.

3. Give the boundary of the north temperate zone and its width in miles. What portions of Europe, Asia and Africa are included in it?

4. On a coasting voyage from Halifax to New Orleans, name the towns and cities possible to touch at, and the commodities likely to be traded in.

5. Where and what are: Auckland, Cotopaxi, Montenegro, Florence, Portsmouth, Grampians, Ghauts, Cashmere, Yokohama, Brisbane.

6. Draw a map showing Manitoba and the Northwest Territory westward to the Rocky Mountains. Mark the principal rivers and towns.

Eight marks additional for neat paper.

Values—1, 16; 2, 6; 3, 5+5; 4, 12; 5, 10; 6, 8.

ARITHMETIC.

Time—two Hours.

1. Find the value of $.00185 + .07 \div 3.024$.

2. A field contains 10 acres, 35 square rods; its length is 15 rods, 4 yds., 2 feet; what is its width?

3. What is the value of 21 ac., 3 r., 13 sq. rods of land at \$67.75 per acre?

4. A cistern 4 feet deep, 5 feet long and 3 feet wide, contains 3,750 lbs. weight of water. If a gallon of water weigh 10 lbs. how many cubic inches in a gallon?

5. What will it cost to paper a room 16 feet long and $14\frac{1}{2}$ feet wide with paper at 75 cents a roll, each roll covering 50 square feet; deducting two windows 7 ft. by $2\frac{1}{2}$ ft. and a door $7\frac{1}{2}$ ft. by $3\frac{1}{2}$ ft.

6. I gain \$2.50 by selling 5 bushels of clover seed at the rate of $62\frac{1}{2}$ cents for 8 lbs.; What did it cost me per bushel?

7. A can do a piece of work in $\frac{5}{8}$ of a day, B in $\frac{7}{8}$ of a day, and C in $\frac{3}{4}$ of a day; in what time could A and C do it;

8. Find the interest on \$328,500 at 5 per cent. for 200 days.

Values—10 each. Full work required.

HISTORY.

Time—one Hour.

1. Describe the reign of Elizabeth and the principal persons connected with her government.

2. What are the necessary steps to be taken before a law is put upon the statute book in England or Canada?

3. Describe the events that led to William III. becoming king of England.

4. To what does the Yorktown celebration, recently held in the United States, refer? Describe briefly the war which it closed.

5. What was the beginning of parliament in England? What does parliament now consist of?

Values—10 marks each.

SPELLING.

(Not to be seen by pupils.)

1. He, burnin'g for vengeance, retired with his nephew to his principality.

2. Opposite this magnificent array of foreign auxiliaries were marshalled three native columns of miscellaneous forces.

3. This unparalleled instance of undaunted valor dismayed the enemy.

4. He flurished a whip professionally and drove a swaggering, rakish, dissipated London coach.

5. After a long time had elapsed, her indomitable courage was suitably rewarded.

6. A permanent state of hostilities and massacres was established, independent of peace or war at home.

7. They quieted their consciences by assuming the character of dispensers of poetic justice.

8. Nothing occurred to disturb the hunter, who was quietly and busily engaged in household operations.

9. When the disembarkation was completed, General Brock sent forward a detachment of Indians as skirmishers.

10. He then, in appropriate terms, which would have done credit to a legislative assembly, proceeded by beautiful metaphors and a narration of facts, which I can only inaccurately repeat, to explain the gradual and continuous decline of his people.

Values—50, 3 marks off for each mistake.

READING—Value, 50.

WRITING—Value, 40.

Practical Department.

TEMPERATURE, VENTILATION, SEATING, AND PROPER POSITIONS IN THE SCHOOL-ROOM.

BY JAMES L. HUGHES.

What can the teacher do in order to promote the health of his pupils while they are engaged in studying in the school-room? However great his responsibility may be in regard to the intellectual culture of those in his class, it is certainly not greater than that which devolves upon him in connection with their physical well-being. He can do much to prevent permanent injury to their bodies by the constant observance of a few simple rules, which are based on common sense, and a slight knowledge of the structure of the human frame and the functions of the vital organs. While the whole system is specially susceptible during the formative period of youth, the organs most likely to receive direct injury in the school-room are the brain, the eyes, the lungs, and the heart. The brain is injured by long continued strain without interruption or sufficient variation; the eyes, by defective lighting, by being brought too close to the work, and in some cases by sitting too far back from the black board; and the lungs by lack of ventilation, and by the contraction of the chest owing to curvature of the spine and the improper position of the shoulder blades. To avoid these results, the teacher must carefully attend to four things:

1. The temperature of the school-room.
2. The ventilation.
3. The comfortable seating of the pupils.
4. The position of the pupils under all circumstances.

1. *Temperature.*—This should be about 65° F. The feet should be warm. If the heating is done by a stove, it should be placed near the door, and a casing of tin or zinc should protect the pupils near it from excessive heat.

2. *Ventilation.*—Summer ventilation is easily secured. Winter ventilation is best obtained by conducting the pure air from the outside directly to the stove or furnace by means of shafts, and causing it to circulate through the room by having escape flues for foul air on the side of the room farthest from the stove. Pure air may be admitted through windows, by fixing an upright board about twelve inches wide on the window-sill inside the sash, so that when the sash is raised a few inches, the air from the outside does not flow straight into the room, but is turned upwards by striking the board and does not cause a draft. The same result may even better

be obtained by making a board to fit under the lower sash, when it is raised. This causes the air to come in between the upper and lower sashes, and gives it the desired upward tendency. Drafts must be avoided, and if there is no other way of securing pure air but by opening the windows, the pupils should march or exercise freely while the windows are opened for a few minutes.

3. *Seating.*—The bodies of children are often distorted through their being compelled to sit at desks which are too high or too low. A grievous error is sometimes committed by fixing the seats too far away from the desks in front of them. This compels the child to lean forward, and prevents resting the back. Little ones are sometimes injured in the thighs and spinal columns by being placed on seats which are so high as to prevent their feet from resting on the floor.

4. *Positions of Pupils.*—Incessant watchfulness is necessary to prevent the taking of improper positions by the pupils. The following hints will aid in correcting many errors:

(a) *Position while Reading.*—(1) While sitting: heads erect, shoulders back, backs resting against the backs of the seats, both feet resting on the floor, books resting on the desks at a convenient distance from the pupils, and supported by both hands so that the page would form a right angle with a line drawn from the eye. This position secures the comfort of the body, and keeps the book at a proper distance from the eye. (2) While standing to read: head and shoulders as before, body resting on both feet, book in left hand only. No position could at the same time do more to curve the spine, contract the chest, and injure the eyes, than that too often taken in school by holding the book in both hands and bending the head and shoulders forward.

(b) *Position while Writing, Drawing, or using Slates.*—Different opinions are held as to the pupil's position in relation to the desk while writing. Some teachers prefer the side, some the front, and some the diagonal position. All agree, however, that the feet should be firmly planted on the floor in front of the body, not doubled under it as is frequently the case, and that the head should be erect, the chest forward, and the upper part of the body steadied by placing the left hand on the desk. Every pupil needs to be constantly watched in order to prevent stooping over the desk.

(c) *Position while Standing in Class.*—Pupils are frequently allowed to lean in ungraceful postures against the wall or the desks, when called out in a class. Such pupils acquire careless habits, and lose to a greater or less degree the erectness and compactness of form which are so essential to health and gracefulness. Whenever a pupil stands he should stand on both feet. The habit of standing on one foot frequently leads to curvature of the spine. It is not well for pupils to stand too long at a time. Indeed no exercise or study should be continued long without a change.

(d) *Position while Listening.*—While pupils are listening to explanations by the teacher, or while following the teacher on a map or black board, they should sit with backs against seats, feet on the floor, and arms at the sides, with hands resting on the laps in an easy and graceful position. Folding the arms on the breast is objectionable, as it tends to round the shoulders, and would be a most improper position for either ladies or gentlemen to assume in society. Folding the arms behind is less objectionable.

(e) *Position while Marching.*—Never let the pupils walk on their toes, and never allow them to march with their hands folded behind.

LESSONS ON CHEMISTRY.

I.

1. All things visible are composed of **Matter**, which is capable of assuming three different states or conditions, namely—the solid, the

liquid, and the gaseous form. It possesses different properties, as color, hardness, taste, divisibility, etc. Let us notice especially that it fills space and has weight. We measure the quantity of matter, that is its *mass*, by its weight which is invariable for the same quantity of matter, while the space it occupies, that is its *volume*, may vary very considerably. Most other properties admit of some sort of change or variation, but the science of chemistry rests on the foundation fact that matter is indestructible by any means known to us, and that its weight is unalterably the same and serves to measure the amount of matter present.

2. Matter is not continuous throughout the substance of any bodies known to us. Most bodies are plainly full of pores, and every substance may be forced into less space by cold or pressure, or expanded into a greater volume by the application of heat. We are unable to explain these facts except on the supposition that bodies are built up of a vast number of minute parts, capable of moving nearer to each other under the influence of cold or pressure, and thus causing the whole body to contract in size, like a regiment closing up its ranks; also capable of receding from each other when heat is applied, and thus causing the body to occupy more space, like a regiment with its soldiers spread out in open order. These minute particles of any substance are called **Molecules**, which may be defined as the smallest particles of a body that are capable of separate, independent existence, but incapable of further subdivision without a change of properties.

3. Matter may be subjected to two different kinds of change or variation, namely—chemical and physical. A physical change affects matter in the mass; a chemical change alters the molecule. Though it is sometimes difficult to distinguish these changes rigidly, yet it is not difficult to convey a clear, general idea of the kind of observations with which the chemist has to deal. Molecules are conceived by the chemist to be collections of still more minute portions of matter called **Atoms**. Whether each atom is in itself an aggregate of smaller particles, or whether it is in its very nature indivisible, are questions upon which the chemical theory has no hold. The chemist cannot break up an atom of carbon or of oxygen any more than the astronomer can break up the planet Mars or Jupiter. The absolute weights of atoms have not yet been ascertained. But chemists have discovered how many times heavier each elementary atom is than an atom of hydrogen. Thus we know how many times heavier an atom of carbon is than an atom of hydrogen, namely, about twelve times. We can prove that an atom of sulphur is about thirty-two times as heavy as an atom of hydrogen. The ratio of the weight of its atom to that of hydrogen is called the **Atomic Weight** of a substance. The ratio of the weight of its molecule to that of the hydrogen atom is called its **Molecular Weight**. These atomic and molecular weights have been determined by multitudes of careful experiments, involving great labor and a skillful comparison of results. The evidence can only be understood by an accurate acquaintance with the details of the very numerous chemical processes from the consideration of which they are derived.

4. Chemistry deals with the changes produced among the atoms composing the molecules of bodies, which changes result from a peculiar, and very powerful influence called the *Chemical Force*, *Chemical Affinity*, or *Chemical Attraction*. The similar particles of a mass of matter are held together by the force of cohesion; the atoms of a molecule, and the single molecules of a compound molecule, are bound together by chemical force. The study of this chemical force, its effects, and the laws that govern its action, constitute the special province of chemistry. It is the aim of the chemist to examine the properties of all the different substances that occur in nature so far as they act on one another, or can be made to act on one another, so as to produce something totally different from the substances

themselves. The chemist examines the circumstances under which such changes occur, and attempts to discover the laws upon which they are based. Experiment is the fountain-head of all our chemical knowledge, and every student of the science should strive to acquire an accurate acquaintance with the experimental method of investigation and a clear idea of the method of induction founded upon it. Practical Chemistry explains the various experimental methods and appliances used, and Theoretical Chemistry discusses the truths which may be deduced from the results. We have to learn how to conduct our experiments successfully, and secondly, we have to learn to study the experiments so carefully that we may observe everything about them, and find out all that can be known by correct reasoning from what they teach us.

5. It is the distinctive character of the chemical force to produce a permanent change in the properties of bodies, while their weight continues exactly the same. Weight is the only property in which the compound is identical with its constituents. It is the peculiar and characteristic mark of chemical combination that substances acquire new properties on combining with one another, their weight remaining unchanged. Thus we may by heat convert ice into water, and water into steam. But as soon as the heat is removed, the steam relapses into water, and the water is frozen into ice. The changes are only temporary. There is no alteration of chemical properties. Each minute particle of ice, water, or steam has retained all the same essential properties, has contained the same substance, each molecule made up of the same three atoms, namely—two atoms of hydrogen firmly bound by the chemical force to one atom of oxygen. The heat has varied the physical form of the water without altering its chemical qualities. It has merely driven the molecules farther apart, in opposition to cohesion; the molecules themselves have been entirely unchanged. But when the chemical force comes into play, as when fine iron filings are heated along with finely powdered sulphur, a change of unique character ensues. There is a complete change of chemical properties and atomic constitution. The former properties of the constituents disappear, and with the advent of the new compound, new properties make their appearance. The metallic lustre, magnetism, malleability, etc., of the iron vanish, along with the pale yellow color, the crystalline appearance, glassy aspect, etc., of the sulphur. The dark, porous mass formed by their union, resembles neither iron nor sulphur, and has a set of properties distinctly its own, not borrowed from either of its constituents. Notice carefully, however, that its weight is the sum of those of the iron and the sulphur, also that though we grind it into the finest powder, we cannot by mechanical means recover the iron and sulphur again in the separate state. Similarly, if white mercury and yellow sulphur be heated together, they combine and produce bright scarlet vermilion totally different from either in properties and appearance, but precisely the same in weight. No way is yet known of predicting what these new properties will be. We can only ascertain them by our method of experiment. No amount of abstract reasoning before the actual trial could inform us that two intensely poisonous substances like chlorine and sodium would produce common salt, not only harmless but actually necessary to life; that the air we are breathing would contain the elements of a deadly poison, namely, nitric acid; that sugar would be found to be entirely composed of charcoal and the elements of water; or that three harmless elements like carbon, hydrogen, and nitrogen would combine to form prussic acid (HCN , hydrocyanic acid), one of the most formidable poisons known.

6. The chemical force frequently alters the physical properties, as color, taste, smell, temperature, or volume. It often changes the physical form. Two gases may produce a liquid or a solid, two solids a liquid or a gas, two liquids a gas or a solid, etc. The only

property which chemists have found absolutely unchangeable is the weight. In every instance the weight of the compound is the same as that of all its materials weighed together. Thus we see the first-rate importance of the *Chemical Balance*, the best of which are now constructed so as to turn with less than one millionth part of the substance weighed. By combining the methods of reversal and substitution, with the method of vibration or oscillation, by which the excursions of the moving beam are accurately observed, the chemist can determine the true weight of a body with a very close approximation to accuracy. Light and electricity are often evolved as the result of chemical union or disunion. Heat is also commonly evolved or absorbed, that is the body grows hotter or colder than its constituents were previously to their combination.

7. The chemical force acts only at imperceptibly small distance and between minute particles of different kinds of matter. This distinguishes it from the physical forces, which act through considerable spaces, as gravitation, between masses of matter, and matter either of the same kind or of different kinds, as cohesion and capillary attraction. It plainly follows that chemical action will be promoted by all circumstances and conditions that tend to bring the constituents together in a very fine state of subdivision, to shake the molecules and atoms apart, to bring molecule to molecule, or atom to atom. Hence pulverisation, solution, fusion, vaporisation, percussion, high temperature, and a powerful current of electricity, are means commonly employed to bring about a desired chemical combination or decomposition.

8. Chemical union takes place with the greatest ease and energy between those bodies which have the least chemical resemblance, which possess the most widely different properties, as sulphur and mercury, nitric acid and copper. It always takes place between fixed, definite, unchangeable proportions by weight of the elements. This serves to distinguish a chemical compound from a *Mechanical Mixture*, in which any ingredients may be chosen, and their proportions varied within all conceivable limits. The mixture will acquire no new chemical properties but will partake of all the its constituents, for example its specific gravity or comparative weight, and its color will lie intermediate between those of the ingredients. Fine sand mixed with pulverised sugar is both gritty and sweet. Brass, type-metal, solder, german-silver, bell-metal, fusible-metal, bronze, gun-metal, pewter, and our common coins are mechanical mixtures. They are alloys or mixtures of similar metals, not united in any fixed, definite and invariable proportions by weight. Gunpowder is a mixture of nitre, sulphur and charcoal. It is characteristic of mechanical mixtures that their ingredients can be separated by such simple means as solution, filtration, diffusion, and crystallisation. Thus take a little gunpowder and place it in warm water; the water will dissolve out all the nitre. Filter the liquid and evaporate; the nitre will be deposited at the bottom of the evaporating dish. Now take the black powder left in the filter paper and put it in some carbon disulphide, a volatile liquid which will dissolve all the sulphur. Again filter and the charcoal alone will now be deposited on the paper, and in a few minutes the carbon disulphide will vaporise (N. B. The vapor is poisonous) and leave the sulphur on the dish. Again, take two or three grains of gunpowder and reduce to a fine flour. Place a little of this under the microscope, and the separate particles of carbon, nitre, and sulphur will be seen lying side by side, and not chemically combined. The explosion of gunpowder is the result of rapid chemical union. When iron filings and sulphur are ground together to a fine powder, the mixture assumes a greenish tinge, and the elements are no longer separately visible to the naked eye. But a lens shows them lying disunited; a magnet stirred through the mixture will draw out the iron; carbon disulphide will dissolve the sulphur and let the iron fall to the bottom.

(To be continued.)

PRACTICAL HINTS FOR TEACHING PRIMARY CLASSES
TO READ BY ANY METHOD.

BY JAMES L. HUGHES.

II.

2. Let the pupils bring their slates to the reading class. "Activity is a law of nature." Children learn by doing. The surest way to be certain that their minds are occupied with what you are trying to teach, is to compel those minds to direct their fingers. If a boy's fingers are at work printing or writing, his own mind must guide them, and so his attention is made an absolute necessity. Too much dependence has been placed on the use of tablets in the past. The eye alone has been used to far too great an extent in learning reading as well as other subjects. The eye is undoubtedly the best gateway to the mind, but is not the most certain means of compelling the mind to take definite action. The teaching processes may be classified as follows:

1. Teaching by verbal explanation only.
2. Teaching by showing things already prepared, such as maps, charts, tablets, &c.
3. Teaching by allowing the pupils to look at work done in their presence.
4. Teaching by making each pupil do work for himself.

The last should be the foundation method of teaching every subject. The other methods should be subsidiary aids merely, used to render the last method as perfect as possible. They should be used for the shortest possible time, and to the smallest possible extent. When they have to be used teachers should remember that they are valuable in the inverse order to that in which they are stated. Showing a thing, is better than talking about it, making the thing in the presence of the class is infinitely better than merely showing it; but the aim of all teaching is to enable the pupils to know and do for themselves.

It may be urged that in reading, the work of the pupil is not done with the fingers but with the eyes, and in oral reading with the vocal organs, and that consequently children do not need to use their slates. The reply to this is twofold:

1. The eye is compelled to act more critically by the use of the slate than in any other way.
2. The mind is compelled by the use of the slate to note carefully what the eye sees in order to be able to direct the hand in printing or writing.

These two reasons account for the well known fact that doing a thing once with the fingers by writing or otherwise, will make a more lasting impression on the memory than a dozen verbal repetitions. The slate should unquestionably be brought to the reading lesson in the primary classes, until the pupils have been made thoroughly acquainted with the elements they are to use in reading. Reliance on the printed tablet alone has done much to make the teaching of reading the stupefying process it too commonly is and to produce the monotonous droning which is popularly known by the name of reading.

The following are some of the ways in which pupils may profitably use their slates in a reading class:

1. They may copy the words put on the board by the teacher. This should only be done at a very early stage, as it would afterwards occupy too much time. In more advanced classes the lesson may be copied after the pupils return to their seats. They should both write and print from the beginning.
2. The teacher should often sound words, and ask the pupils to print or write them on their slates. At first these should be only regular words such as cap, desk, step, slap, &c., containing no silent

letters, but in a few weeks the little folks will be able to write harder words and mark the different sounds of the vowels, strike out silent letters, etc.

3. The teacher may write such words as ought, bc., lamb, sword, &c., and after pronouncing them, require the pupils to strike out the silent letters, and mark the vowels to show the correct sound. More difficult words may be treated in a similar way as the pupils advance.

4. The teacher may write words on the board and require the pupils to alter the marking so as to change the pronunciation of the words. Each pupil may then be asked to sound the word as he has it marked.

5. The teacher may write the beginnings and endings of words, as P—t, and ask the pupils to fill the vacancies with various letters properly marked so as to make as many words as possible. At first the spaces should be filled by a single sound, then two or more sounds may be called for as the class progresses.

The last four exercises enable the teacher to test thoroughly the progress made by the pupils in gaining a practical knowledge of the powers of letters, and will greatly facilitate their acquirement of a ready grasp of the sound of a word by a glance at its elements. These exercises may be made to have all the fascination of games for the pupils, and they enable them to learn the sounds of the letters in the only philosophical way in which anything can be learned; by using them.

6. When a new word has been taught, the pupils should always be set to find how often it occurs in the lesson in hand. Pupils are sometimes asked to point out the word in as many places as they see it. Only one at a time can be tested in this way, and every pupil ought to act for himself. Let every pupil count as many of the new words as he can see, and write the number on his slate. Then let the one who saw the smallest number point them out, call on some one else to show more, and continue till all have been shown.

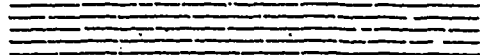
7. Each pupil may be required to write out a few words about some subject suggested by the teacher or one of the pupils, and to read what he has written. It is astonishing how very quickly pupils properly taught from the beginning will put words together to make little sentences. Such pupils never know when they began to write compositions.

TONE TALKS WITH THE TODDLERS.

BY MRS. G. RICHES, TORONTO.

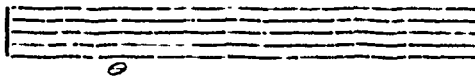
No. 1.

You have all seen a pretty little pussy; tell me what it said. That is right. It cried Me-yow, Me-yow! If I had a little kitty in my table-drawer, would you like to hear it say Me-yow? You would, and Willie would like to see it. I have not a pussy, but I can make on the board some queer little things that sing. Would you like to make them? Well, then, take slates. Now watch.



What have I made, Johnnie? A ladder. How many steps, Mary? Five. Let us count together—one, two, three, four, five. Those little fellows that we are going to make are like monkeys, great climbers, and the ladder is for them to sit upon. Have you all made the ladder? Very good. Now make a short step under the ladder. That is for a queer little fellow who never climbs very high. Hold up your slates so that I can see the short step. All right. Now for

the little fellow that sits on the short step. Here he is,



See how he opens his mouth ! He knows he couldn't sing well unless he opened his mouth wide. Make him on your slates, and then I'll tell you what he sings. Do, do, d-o. Sing together. Boys alone. Girls alone. Together. Thank you. When you sing together you sing well, but this little fellow sings alone. How many of you can sing alone ? Only Tom ? Let me hear you, Tom. Do, do, d-o. That's splendid ! Tom, I'm proud of you. Well, Willie, what is it ? You want to sing alone ? That's right. Sing loud, like a little man. Now Charlie. Now Mary. Very good.

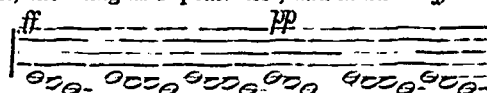
This queer little fellow has a dear little sister, and she is very fond of her brother, she stays near him. Shall we make her, too ? Well, then, put her right above the short step, and under the first long step. What does she look like ? A ball on a table. Fred says, and Annie thinks, she is like an egg on a shelf. Now listen to the little song she sings to her brother—Re, re, re ; re, re, re. Class sing. Again. Once more. Now, we'll have a talk between the brother and sister. When I point to the queer fellow, sing what he says, and when I point to the sister, sing what she says : Do, do, do ; re, re, re ; do, do ; re, re ; do, re ; do, re ; do. The boys will sing what the brother says, and the girls what the sister says. Watch the pointer, or you will go wrong. Do, do, do ; re, re, re ; do, do ; re, re ; do, re. Willie and Minnie sing alone. Willie the do's, and Minnie the re's. Do, do ; re, do ; re, re, do. Thank you.

Now, we'll make a bold little boy, who always shouts out his own name. Put him on the first long step, and tell him that he must stay there, or you'll have to rub him out. Hear him cry out—Mi, mi, mi. You do the same. Once more. Sing now as I point—Do, re, mi, mi ; mi, re, do, do, do, re, re, mi, mi ; mi, mi, re, do ; do, re, mi ; do, re, mi ; do, mi ; do, mi ; mi, do. Boys sing do, girls mi. Now watch my hand, when I close it, the boys are to sing do, and the girls mi. Thanks. When the queer little fellow and the bold boy sing together, do you like the sound ? I'm glad you do.

Now our little friends are going to have a game of hide-and-seek, when they are hid, they call out la. Listen ! Tell me who this is ? (teacher sings, and the pupils name the notes as she sings them.) La. Yes, that is do. La, Willie says, that's the sister. Who's this ? Mi. You are right ? La, la, la ; do, re, mi ; la, la ; do, mi. You see how nicely you can find them.

When pussy runs up stairs, does she make a great noise ? No ; she goes up softly. P.P. stands for pretty pussy, and when I write pp on the board, you are to sing softly, just like pussy running up stairs. Sing pp do, re, mi ; do, mi ; mi, re ; re, do.

Frank and Fred run up stairs softly, too, don't they ? No ! How do they go up ? Noisily. Fannie says they make a loud noise. Now we'll put down F.F. and sing as Frank and Fred go up stairs. Do, mi ; do, mi, re, re, do, do. Shall we sing a song about pussy ? Very well, then sing as I point first, and mind the ff and pp,



Willie sing it alone. Thanks. You all know "Ding dong bell." Now, when I point to mi, sing the word "ding," when re, sing "dong," when do, sing "bell," and so on to the end. Very well done. Copy this little song on your slates, then put the names of our little friends on a line below ; but, first, I must tell you a secret. Those little creatures come from a country far away from here, where they do not spell as we do, and you must not laugh when I tell you the bold boy spells his name m-i, and the sister hers r-o, and the queer little fellow his d-o. So when you write their names, spell them as they do, and then they'll not be vexed.

HOW TO MAKE A CHILD WISH TO COME TO SCHOOL.

BY JOHN B. ADAMS, COOK'S CREEK, MANITOBA.

"A school," says Cousin, "ought to be a noble asylum, to which children will come with pleasure, and to which their parents will send them with good-will." Children do not like to attend school because they are happier elsewhere. Our grand aim then should be, if possible, to make them happier in the school-room than if they stayed at home. How is this to be done ? Give them bright surroundings. The lives of the little ones should, if possible, be made bright, beautiful, and full of sunshine. Let the school-room be kept exquisitely neat. Adorn its walls with bright-colored maps and tablets, and a few carefully selected and neatly framed prints or chromos (or oil paintings if really meritorious). The latter should be placed there not only for decoration, but as illustrations of some subjects of instruction. Let a few flowers be grown in boxes, in summer, and a bouquet be placed upon the teacher's desk, and from the performance of such acts of love, the pupils will learn to love their teacher and their school.

Some one has said,—

Give, oh, give me the man,
Who sings at his work.
He will do more work,
And do it better.

Song lightens labor. Vocal music should form one of the branches of instruction. This, however, may not be possible, as the teacher may be unable to teach it. If he cannot sing or teach singing, this need not always prevent the pupils from singing, as often some of them can sing fairly or well. These can lead, and the teacher and school can join in. When the scholars evince signs of weariness, all work should be dropped, and they should be awakened up with a sweet, inspiring hymn or a merry, lively song. The children can be marched in and out, the school opened and closed, the copy-books distributed and collected, and much of the mechanical work can be done to singing.

Physical exercises should also be practised for a few moments, several times a day, especially when the children evince dulness or languor.

Many bright, lively children dislike school because they prefer play to work. This love for play, which is natural to all healthy children, often operates against the successful working of the school. But it need not. It can be made a great help instead of a hindrance. It can be taken advantage of to make school pleasant. Encourage the pupils to get up games during recess and dinner hour. Let them be provided with bats, balls, swings, and gymnastic appliances, however rough and ready the latter may be. If these things cannot be obtained in any other way, let a subscription be taken up among the parents for the purpose, the teacher contributing liberally himself. He will be amply repaid for any little outlay he may make in this direction by the marked improvement which will be effected in the school. Children should have much physical and out-door exercise. This fact is beginning to be more generally admitted, but its importance is still under-estimated. It is said that the Duke of Wellington, when once looking on at the boys engaged in their sports on the play-ground at Eton, made the remark,—“It was there that the battle of Waterloo was won.” It was the culture of the body that contributed greatly to the power and glory of ancient Greece and Rome. In these nations calisthenics were not left to boxers and drill sergeants only, but were a part of the regular school education. Orators, philosophers, poets, warriors, and statesmen received much of their training in the gymnasium. The blood was thereby made wholesome, the nerves healthy and strong.

the digestion sharp and powerful, and the whole physical man developed into the fullest health and vigor. Look at the achievements of the British army and navy. Their soldiers cannot be surpassed in toughness and endurance because they are fond of exercise, and love the fresh air. Great Britain is largely indebted to the foot-ball contests at Eton, the boat-races on the Thames, and the cricket matches on her downs and heaths, for the splendid dominions which she possesses in every quarter of the globe. "Morning drum-beat, following the sun, and keeping company with the hours, circles the earth with one continual unbroken strain of the martial airs of England." Why? Because her people cultivate self-reliance and their breeding develops endurance, courage, and pluck.

Children cannot be happy where they are not comfortable. For comfort a frequent change of posture is necessary. The young, when at play or when their time is their own, stand much more than they do at most schools. They should, therefore, stand when saying their lessons, and, if they wish, when learning them. They should not be allowed to lean over their desks. They should be taught to sit as upright as possible, especially when writing. Their shoulders should be well thrown back, their chest expanded, and their carriage erect. A few minutes' drill every day from the "Monroe Manual" will have a beneficial effect. Variety is the spice of life. At some lessons let the pupils stand, with their arms hanging by their sides; at other lessons, with their hands behind them; at others, with their arms folded before, and still at others, with their arms folded behind them. No lesson should occupy more than twenty minutes, and at each change of lesson there should be a change of posture or place. A change of room, where feasible, is a capital thing to relieve the monotony.

Some of the pupils may act as school-officers, whose duty may be to assist the teacher in the mechanical work of the school. They can assist him in marching the scholars in and out, in collecting and distributing writing materials, in the supervision of the children upon the play-ground, &c. The officers should be elected by their school-fellows, the absence of bad marks for at least one month preceding the election, being the qualification for office. The term of office should be short, so that as many as possible might have an opportunity of serving, and no one would have to wait too long for a chance of the distinction. An election of officers might be held weekly. The carrying out of methods such as these will interest the scholars in their work and in the good government of the school. It is a good idea to have a picnic once or twice a year. It helps by force of association to endear the little ones to their school, and creates a sort of *esprit du corps*, which may be turned to good account.

The monthly publication of marks in the newspapers stimulates to good conduct and industry. Have also a spelling and a reading match now and then, and publish the results with the names of the competitors in the public press. It is a good idea to form the school into a literary society for a few hours about twice a month. Let it elect its own president and secretary, and conduct its own business. However, the teacher should carefully watch its proceedings, and reserve to himself the power of vetoing. Readings and recitations from standard authors, discussions upon the meaning of passages in their productions, and original essays should form the order of the day. The members should also criticise each other's performances, pointing out their excellencies, and kindly drawing attention to their defects and suggesting remedies. Previous to the close of the meeting, the teacher should review everything that has been done. While the meeting is in progress, the younger children, who do not understand the subjects before it, and cannot therefore be expected to be interested in them, could be engaged with a box

of toy letter-cards, which can be purchased from 60 to 80 cents, in some of the many letter or word games, such as "word-building," "out in the cold," "puzzle your neighbour," "the travelling letters," "patchwork," "loto," "the spelling match," "syllabication," "letter-pool," &c. It may be argued that most school children are not sufficiently advanced to conduct literary discussions. They may be a little awkward at first, but, I believe, if they are properly trained, they will soon learn. Every school should have a library. Good wholesome literature should be placed in the hands of the young. Give them the works of Shakespeare, Ben Jonson, Sterne, Goldsmith—every boy and girl should read the "Vicar of Wakefield,"—Tom Hughes, Kingsley, Marryatt, Cooper, Dickens, Thackeray, and Walter Scott. Give them a taste for such reading, and they will have no wish to indulge in the trashy literature that circulates so freely. Their characters will be moulded by their reading. Above all, give them the Bible. Do not neglect religious teaching. Well spoke George Washington when he said: "Reason and experience forbid us to expect that national morality can prevail in the exclusion of religious principle." "I prefer," said Dr. Arnold, "that my pupils should drink from a running stream rather than from a stagnant pool." The teacher should prepare each day's work carefully, in order that he may be able to stand before his classes fresh upon each topic, thoroughly master of it, and able to throw life, spirit and snap into his teaching.

Let the pupils go home at 3 o'clock p.m. instead of 4 for good behaviour, and when their work has been well done. This will be found to operate much better than keeping in for unlearned tasks, and with this stimulus they will do their best. At any rate, five hours a day and five days in the week is long enough for the school to be in operation. The Protestant teachers of the Province of Quebec, at a meeting held in Montreal, in 1876, were deliberately of this opinion. The arguments adduced in favor of the five hours system were convincing. It is supported by many of the very best practical teachers and many of the highest educational authorities. Wherever it has been tried, both in town and country, it has been eminently successful.

It is to be hoped that the day is not distant when all our schools will emulate the excellent example set them by Winnipeg and some other places in the matter of school-houses, school-furniture, apparatus, play-grounds, &c. The desks should be comfortable. They should be provided with foot-rests to protect the feet, as the air is always cold close to the floor. The seats should always have good backs. It is of the utmost importance that the school-room should be well ventilated with openings as near the ceiling as possible.

A pleasing manner is indispensable to the teacher. "Thank you, my dear," said Lundyfoote to the little beggar girl, who bought a penny-worth of snuff. "Thank you, my dear, please call again," made Lundyfoote a millionaire. Courtesy, refinement, and gentleness are as effectual in rendering the school-room attractive, and in winning the hearts of children as they are in promoting their possessors' advancement in life. These qualities are too much neglected in the education of youth at the present day. They should certainly be imparted to the children. "Give a boy address and accomplishments," says Emerson, "and you give him the mastery of palaces and fortunes wherever he goes; he has not the trouble of earning or owning them; they solicit him to enter and possess." A good address can be best taught by example. The way to teach the young to be polite is to treat them with politeness. Every one should be as polite to a little child as he should be to the Queen. A teacher should not acquire his manner from the study of artificial rules of etiquette. His courtesy should spring from a good heart, and from a sincere and earnest wish to be agreeable to his fellow-creatures.

It should be like the oratory of the brilliant and genial Sheridan, of whom it has been written :

"His wit in the combat, as gentle, as bright,
Never carried a heart-stain away on its blade."

He should emulate in his every-day bearing the self-sacrificing and noble Sir Philip Sidney, the pattern to all England of a perfect gentleman, the hero that, on the field of Zutphen, pushed away the cup of cold water from his own fevered and parching lips, and held it out to the dying soldier at his side! Shakespeare says :

"A merry heart goes all the day,
Your sad tires in a mile, oh!"

A teacher should cultivate a pleasant, cheerful, sunny, happy disposition. He must not carry any of his personal troubles into the school-room. His manner there must be pleasant and free from gloom of any kind. He must see the bright side of everything. Every thing has a bright side. Let the clouds hang ever so heavily, the sun still shines behind them. He must avoid all gloomy companions and sad and worthless literature. His recreative reading should consist of the works of Shakespeare, Swift, Dickens, Thackeray, Walter Scott, and Sydney Smith. For professional reading, the CANADA SCHOOL JOURNAL is indispensable. His temperament is greatly dependent upon his bodily health. If his health be vigorous, his spirits are elastic and buoyant. He should therefore take much exercise in the open air. One can get a good broad sweep of it on the prairies. The open air is life; the want of it, death. Lady teachers should do a little housework. The sleeping room should be light, large, airy, clean, and lofty. It is a very healthful exercise to sing and inhale lungfuls of breath frequently. Keep early hours, avoid everything indigestible, eat plain food, and have nothing to do with quack medicines. Rub the body into a glow after every bath. Night and morning, when undressed or half dressed, throw the arms and elbows back, in various ways, in such a manner as to open the chest, and fill the lungs with fresh air. Lady teachers will find it easier to swallow great doses of nauseous medicine than to perform these exercises, but the latter will do them far more good.

The teacher should fully appreciate the importance and dignity of his office. I consider it no disparagement to the pulpit to say that the profession of teaching is the highest and holiest in the world. The teacher has the honor to be the servant of the feeblest, the most inexperienced, and the most helpless; to stand, as it were, at the portico of the temple of God, guarding the house and keeping it from pollution. That was a beautiful saying of Dr. Dwight:—"He that makes a little child happier for half an hour, is a co-worker with God." A teacher should love his work, and overflow with a deep and burning enthusiasm. He should throw his whole self upon his work. He should pour into it the whole stream of his activity, all the energies of his hand, eye, tongue, heart, and brain. As a great writer, in speaking upon force of character, says:—"What you can effect depends on what you are. You put your whole self into what you do. If that self be small and lean and mean, your entire life-work is paltry, your words have no force, your influence has no weight. If that self be true and high, pure and kind, vigorous and forceful, your strokes are blows, your notes, staccatos, your work massive, your influence cogent—you can do what you will. Whatever your position, you are a power, you are felt as a kingly spirit, you are as one having authority."

Read before the Manitoba Teachers' Association and published at the request of the members.

Notes and News.

ONTARIO.

The attendance at the Ontario Business College, Belleville, during the months of November and December, was the largest the College ever had at that season. First class work will gain public confidence.

At an entertainment in connection with Tyrconnel public school, which was presided over by Mr. Butler, I.P.S., and was largely attended, Mr. James E. Orr, Principal, was presented with a copy of Worcester's unabridged dictionary and other gifts, in recognition of his talented and energetic services. Mr. Orr has been re-engaged with an increase of salary.

Mr. John Raine, of Carleton Place, for some years Master of the Perth Model School, has been appointed Principal of Tilsonburg public school, at a salary of \$700. He will be assisted by Misses Abbott, Hamilton, Hillman and Caulfield.

Mr. William Callin succeeds Mr. William Lyle in the senior department, Shakespeare school, and Miss Kate McLellan has been re-engaged in the junior department. Mr. Lyle, who goes to Hamilton with the reputation of being a highly successful teacher, is to receive a much higher salary. The *Stratford Beacon* in noticing this change observes: "It might be worthy of notice that as soon as it was found that Mr. Callin was likely to be engaged, another of the applicants generously offered to teach for \$50 less, but the trustees wisely concluded, not being auctioneers, that any man's services could not be worth more than he himself valued them at." The *Beacon* would have benefited the profession by giving the name of the generous applicant, as we hear a good deal about such self-abnegation lately. A list of these "bidders" would form an interesting "roll of honor."

Teachers are plentiful in supply! Seventy applications were received by the Guelph School Board for vacancies in their schools; for a vacancy in Northumberland county nearly one hundred applied, and for eight vacancies in the Almonte High and Public Schools there were one hundred and forty-one applicants! For the Orillia School, seventy replied to the advertisement! The result may be easily guessed at. Several school boards are cutting down the salaries, and many good teachers feel their positions insecure. The applicants are chiefly youths.

The new County Model School regulations are exercising School Boards somewhat. In Lindsay and Goderich the members are doubtful whether the County Councils can reasonably bear the additional expense. In the latter town it was suggested to discontinue the Model School, but no decisive action was taken. The regulations causing this trouble are that the school boards concerned are required to furnish an extra teacher during the two sessions of four months in each year. An extra has also to be provided for Model School purposes. It is further ordered that the Master of the Model School shall have a first class certificate. It is also provided that the government grant shall be \$150 per annum, and that the County Council are to furnish a like sum.

School hygiene is a subject much discussed at present, and necessarily so, because public opinion needs to be directed to its absolute enforcement. What will be thought of the following state of the school at Point Edward given by a correspondent to the *Sarnia Observer*? "The present building is nothing more than a barn, and is not worthy of the name of a school-house. It certainly is a disgrace to our rising town. The inspector visited the school, and states that he cannot allow such a state of over-crowding to exist in so small a place, as it is very detrimental to the health of the children."

Mr. James Lumsden, of Omemece, has been appointed Head Master of Mitchell High School, at a salary of \$800 per annum, in the place of Mr. O. J. Jolliffe, B.A., resigned.

The position vacated by Mr. Wm. Rothwell, B.A., in Brantford Collegiate Institute, has been accepted by Mr. I. J. Birchard, B.A. late Principal of Perth Collegiate Institute.

The Bowmanville Board of Education has decided to take no action at present on the separation of the High and Public Schools. The step was suggested by the Head Master, Mr. Wm. Oliver, B.A., on solid grounds no doubt.

The *Almonte Gazette* states that "the programme laid down by the Council of Education embraces far too many subjects." Query, how many of them may be omitted with advantage to the pupils?

Mr. George Muldon, Head Master, Model School, Cornwall, has been re-engaged without solicitation.

The Guelph Board of Education has advanced the salaries of the teachers. Mr. McLeay's was increased by \$50; Misses Budd, Aiken, and Cooley by \$50 each; Miss Short by \$25, and the teachers of 1st and 2nd books, \$25 each. A male teacher is required for the senior third (boys) department at the Central school at a salary of \$450. The amount paid hitherto in Guelph for High School salaries is \$3,250, viz: Principal, \$1,050; assistants—two males, \$900 and \$800, one female, \$500. For Public Schools, \$7,125, viz; males, fourth senior department, \$600; fourth junior do., \$550; third senior do., \$500. Females, 1st and 2nd book, four teachers, each, \$200; third junior, five teachers, each, \$250; one senior, \$300; fourth junior, \$350; fourth intermediate, \$400; fourth senior, \$500. The proposed additions, together with the salary of the new teacher, will make the total amount of public school salaries for next year, \$8,125. The teachers whose salaries were increased, were highly complimented by the Board, especially the Principal.

Mr. A. W. Guttridge, late Master of Perth Separate Schools, has been appointed Principal of the Separate School, Lindsay, at a salary of \$500.

Mr. John Noble, Head Master of Newcastle Public School, has accepted the position of English Master in Brockville High School, notwithstanding a tempting offer by the Board of a liberal increase.

Miss Caughell, junior teacher, New Sarum Public Schools, was presented with a handsome ring and an address on the occasion of her leaving that school to take a place in Richmond school.

After the examinations in the Picton High School last month, the silver medals offered by W. J. Porte, Esq., and Mr. Murray, were presented to the winners; the former for general proficiency to Miss May Sawyer, and the latter for best entrance examination to Miss Helen May Morrill. The prizes which are very handsome and suitably engraved, being handed to the young ladies by Mrs. Merrill, wife of the Chairman of the High School Board, and Mrs. Ross, respectively. Mr. Dobson (Principal), Rev. J. F. German, R. A. Norman, Esq., Chairman P. S. Board, John Twigg, Esq., of the H. S. Board, and Mr. R. W. Murray, Principal of the Public School, gave short, appropriate addresses.

At the public examination held in the London South School last month, Mr. A. McQueen, Principal, and his staff were highly complimented for their painstaking labors in the cause of Education.

At the Brantford Public School Board meeting, held 7th ult., Dr. Harris highly complimented Mr. W. Wilkinson, the Principal, on his very satisfactory and detailed report, and remarked that the schools were in a better condition than ever before. There was a saving on salaries of \$383 for the past year.

A parent in Bracebridge, indignant at a little correction given his son in school by Mr. Neilly the teacher, has been committed to trial at the next assizes for assaulting Mr. Neilly with a heavy walking-stick.

Rev. Father Stafford, of Lindsay, speaking recently of education in Europe, said that neither in England nor on the Continent had he seen the Schools so well supplied with maps, globes, and other school furniture, as in Ontario. In Rome he had a conversation with the Cardinal Prefect of the Propagandi, Cardinal Simconi, who remarked that nowhere were the rights of Roman Catholics better recognized than in Canada, and that England was doing well everywhere for education.

The *London Free Press* advocates school decoration as a standing lesson of neatness and order, and asks: "What legislature will offer a premium—and it should be a good one—to the district maintaining the best appointed school-house with the most neatly ordered and most judiciously planted grounds?"

Mr. R. W. Hicks has been appointed Head Master of Madoc Model School, in place of Mr. Kirk, who goes to Cobourg, as already noticed in the JOURNAL.

When teachers are studying medicine and anatomy with a view to becoming doctors, it is not right to turn the school-room into a dissecting room; and it is decidedly objectionable to rob the neighbouring cemetery for subjects of study. Mr. E. H. Bailey, a teacher in Mount Forest Central School, is reported to have allowed his ardour in desiring to shine as a medico, to over-rule his discretion, and the indignation he has raised, as certain discoveries have brought matters to light, will not add to his peace nor permanence in his position,

Mr. Alexander, of Galt, has been advocating the "half-time system" before the trustees and teachers of London.

Mr. C. H. Sec 6, in an address to the Kingston Teachers' Association, showed that a person does not need to be an artist to teach drawing. All that was needed was a good use of the eyes.

Mr. Marling, H. S. I., has sent in his report of the London Collegiate Institute, which, generally, is satisfactory. The report concludes thus: "The Institute appears to be, on the whole, in a healthy condition, and a good spirit of work animates the majority of the pupils."

Toronto Public Schools closed December 22nd for Christmas vacation. The concluding exercises, which were witnessed by a large number of visitors, consisted of recitations and singing. On the black-boards some excellent specimens of maps and free-hand drawing were exhibited, which reflected the highest credit on the pupils. Certificates of merit for attendance and good conduct were presented to those entitled, and it is a pleasing fact to record that nearly three thousand certificates were issued, or about one certificate in every three pupils. The schools open again Monday, January 9th.

Miss Grant, teacher in Parliament Street School, Toronto, was presented, by the pupils and teachers of the school, at closing for the holidays, with a handsome silver cake basket and butter cooler. The presentation was made by Mr. K. T. Martin, and Rev. Mr. Cameron, on Miss Grant's behalf, thanked the donors in very appropriate words.

In Parkdale the distribution of prizes was quite an event, and the entertainment in connection was largely attended. Three of the assistant teachers are leaving the school, and the pupils of their respective classes presented them with handsome and suitable parting gifts. Miss Warwick received a silver spoon-receiver, and an address from the School Board artistically illuminated by Mr. Ellis, a member of that body; Miss Summerville was presented with a dressing-case; and Miss Dallis with an ink-stand.

The closing exercises in connection with Yorkville Public Schools, Mr. Hendry, Master; Riverside, Mr. Phillips, Master; S. S. No. 10, York, Mr. Hagarth, Master, were entered into heartily by trustees, parents, and friends, who evinced the greatest interest in the proceedings.

Mr. T. O. Steele, Principal of the Perth Public and Model Schools, was presented with a beautiful *escritoir* by the pupils of his class.

A feeling exists and seems to be growing in favor of introducing lessons on agriculture into the Public School programme. In order to teach even the elements, some important changes in the course of study will have to be made, not only in the Public Schools, but in the seminaries where teachers are being prepared.

Mr. W. W. Tamblin, M.A., Head Master of Oshawa High School, has been re-engaged at his former salary of \$1,200. Mr. Tamblin is doing earnest work, which is highly appreciated in the town and its vicinity, and has secured for him many firm friends.

Mr. Sinclair, B.A., Head Master of the Sarnia High School, has been re-appointed at his previous salary of \$1,000.

Mr. D. H. Lent has been appointed Principal of Burlington Public School. He has been a faithful and energetic teacher in the past, and we have no doubt of his future success in his present sphere.

The *Mail* observes:—"Speaking of the ingratitude of republics, a parallel case of the ingratitude of municipalities has just occurred in Huron. The Public School Inspector there (Mr. J. R. Miller), an able and energetic county officer, applied to be relieved from active out-door duty during the trying weather of winter, on account of a severe affection of his eyes, and that he be allowed to provide a substitute. The request was refused. A local paper says:—"Strange to say, the application for leave to provide a substitute was rejected both in committee and in council; and stranger still, the reason for the rejection appeared to be that Inspector Miller had been too assiduous and effective in his duties in the past. The action of the County Council in this instance is certainly not likely to incite county officials to work too hard in the time to come."

Mr. G. Cruickshank of Weston, has been offered the Science Mastership in the High School, Chatham.

Dr. Platt has resigned his position as Inspector of the Picton Public Schools.

At a very successful entertainment given last month in connection with Weston High School, Mr. G. Wallace, B.A., Head Master, the sum of \$80 was raised, which will be appropriated to the scholarship and prize fund.

Mr. Thomas R. Chipsham, who is well known throughout the county of Peel, having for some time attended the Broddytown Public School, afterwards the High School, and, more recently was a student in Pickering College, distinguished himself in a heroic manner on the occasion of the fire in the College. By strenuous efforts and at great personal risk he succeeded in checking the ravages of the fire, and, with assistance, subdued it, but not until about \$500 worth of damage was done. Were it not for these brave services it is more than probable the whole building would have been destroyed. As a recognition of his valuable services, the College Committee have voted him a year's tuition and board free, and presented him with a gold medal hung on gold swinging bars, enclosing his monogram beautifully executed. The inscription on the medal is: "Presented to Thomas R. Chipsham by the Managing Committee of Pickering College in acknowledgement of the heroic services rendered by him, October 27th, 1881, at the fire which threatened the destruction of the College Building. Elias Rogers, Sec., John R. Harris, Chairman." The British American Assurance Co., through Robert McLean, Esq., their inspector, have sent Mr. Chipsham a letter notifying their appreciation of his brave conduct, and presenting him with a cheque for \$150. The following words are extracted from the letter: "The noble sentiments contained in your reply are a credit to your head and heart, and cannot but find a hearty response in every rightly constituted mind."

NOVA SCOTIA.

Rev. J. Burwash, A.M., Professor of Natural Science, in Mt. Allison College, Sackville, N.B., has resigned his chair to assume charge of the First Methodist Church, Charlottetown, P.E.I. Professor Burwash is a younger brother of Rev. Dr. Burwash, Cobourg, Ont. For several years he filled the position of Provincial Assayer as well as that of Examiner in Science to the University of Halifax. The Board of Governors of Mt. Allison College, at a recent meeting filled the vacancy by electing W. L. Goodwin, Esq., winner of the Gilchrist Scholarship in 1877, and B. Sc. of the University of London.

The Rhetorical Exhibition of the Junior Class of Acadia College, was held on the 15th ult. Essays were delivered by the members of the class as follows: "Adam Smith's Influence on the Modern Industrial World," by T. Sherman Rogers, Amherst. "Republicanism in France and in the United States," by D. Spurgeon Whitman, New Albany. "The Influence of the Thinker on his Age," by I. Wallace Corey, Cole's Island, N.B. "Nihilism in Russia," by Joseph S. Lockhart Lockhartville. "The Augustan Age," by Clarence W. Bradshaw, Centreville, P.E.I. "Art in Relation to Strength," by Barclay E. L. Tremaine, Halifax. "The Uses of Biography," by Charles W. Williams, Wolfville. "Alexander at Arbela," by Herbert R. Welton, Wolfville. "The Crusades," by A. Lewis Powell, Amherst. "Gladstone and Beaconsfield," by C. Osborne Tupper, Amherst. "Venice," by William C. Goucher, Truro. "Tennyson's Ideals," by O. C. S. Wallace, New Cannan. At the close the Exhibition Speeches were delivered by several gentlemen. The address of E. M. Chesley, Esq., A.M., Principal of Yarmouth Seminary, seems to have been particularly well timed.

The University Consolidation Association met for the transaction of business on the 29th ult. The Association with guests dined together in the evening at the Halifax Hotel. Next month's notes will furnish a report of proceedings.

The Board of Governors of Acadia College have inaugurated a movement to endow a Theological Professorship in memory of the late Rev. Charles Tupper, D.D. A subscription of \$500 in furtherance of the movement has been received from the Hon. Minister of Railways.

Albert Coldwell, Esq., A.M. has contributed to the *Mail* and *Herald* an interesting sketch of the Acadia College and its Professors. The same papers have published an elaborate history of Pictou Academy, and its important legislative controversy connected with its establishment.

We regret to record the death of Dr. G. J. Farish, of Yarmouth. From the establishment of the Free School System in Nova Scotia in 1864 until the revision of the method of inspection in 1880, Dr. Farish filled the position of Inspector of Schools for the County of Yarmouth with great efficiency.

Angus Chisholm, Grade A. 1880, and B.A., of St Francis Xavier's College, is spending the winter at his Alma Mater in the position of Assistant Professor of Classics.

MANITOBA.

The Rev. W. C. Pinkham, Superintendent of Education, returned from his eastern trip on November 29th, and has resumed his duties with new vigor and enthusiasm. He is preparing a report of his mission, which we hope to publish in the next number of the *JOURNAL*. We understand that it is his intention to visit different parts of the Province from time to time, as far as his office duties will permit, for the purpose of giving information respecting the School Law, and to stir up educational matters generally. No doubt the enthusiasm which he himself feels he will be able to impart, in some degree, to others.

Greatly to the regret of educationists in Winnipeg, James H. Stewart, Inspector, and Mr. John B. Ferguson, Principal, of the Winnipeg Protestant Schools, have sent in their resignations, to take effect at the end of the school year (January 31st). They both intend to take up University work, and to graduate. Mr. Stewart is an undergraduate in Honors of the University of McGill. He intends to apply for his standing in the University of Manitoba and to graduate here. The work of both gentlemen during the past year has been beyond all praise. The staff of teachers in the city schools is an excellent one. It will have to be increased, but the probabilities are that the highest positions will be filled by promotion.

The supply of duly qualified teachers in Manitoba exceeds the demand, and the Superintendent is inundated with applications from teachers in different parts of the Dominion. Mr. Pinkham endorses *bona fide* certificates from other Provinces, when accompanied by a certificate of good moral character; and certificates, so endorsed, are good until the examination of teachers, which takes place in August. Teachers coming to Manitoba must take their chance of finding employment, with those already in the Province.

At the last meeting of the Council of the University of Manitoba, Mr. Rice M. Howard resigned the position of Registrar, and Mr. T. A. Bernier was elected to the vacancy. Mr. Bernier has lately succeeded the Hon. A. A. C. La Riviere, M.P.P., the new Provincial Secretary, as Superintendent of Education for Roman Catholic schools.

The Rev. Alexander Matheson has, in consequence of enfeebled health, resigned his position as Inspector of the Protestant Schools on the east side of the Red River.

The Board of School Trustees, Portage la Prairie, are preparing to erect a very fine central school. The school population has doubled in that town since last spring.

Readings and Recitations.

BUD B'S CHRISTMAS STOCKING.

A POEM FOR THE LITTLE ONES.

I.

It was Christmas time, as all the world knew
It stormed without, and the cold wind blew,
But within all was cheerful, snug and bright,
With glowing fires and many a light.

II.

Bud B. was sent quite early to bed,
His stocking was hung up close to his head,
And he said to himself, "When all grows still,
I will find a big stocking for Santy to fill."

III.

Now good honest Hans, who worked at the house,
Had gone to his bed as still as a mouse;
The room where he slept was one story higher
Than Bud's little room, with gaslight and fire.

IV.

Now Hans loved "the poy" and he petted him too,
And often at night when his tasks were all through,
He would tell him strange stories of over the sea,
While Bud listened gravely and laughed out in glee.

v.

This night Hans had promised to wake Bud at four,
He would come softly down and open his door,
But suddenly Bud bounded out of his bed,
And stole softly up to the room over head.

vi.

On his hands and knees he crouched softly in;
"I'll borrow Hans' stocking," he said with a grin;
"Old Santy will fill it up to the top,
And Hans—oh, such fun—will be as mad as a hop."

vii.

He moved very slowly, and felt near the bed,
No stocking was there, but down on his head
Came a deluge of water, well sprinkled with ice
While honest Hans held him as if in a vise.

viii.

"Vat ish dat?" he cried, "von robber I find,
Den I pound him, and shake him, so much as I mind."
"It is me," called out Bud; "stop Hans, oh please do;
I am only a boy; I could not rob you."

ix.

But Hans did not pause; his temper was hot,
And he dragged the young robber at once from the spot.
When he reached the light hall great was his surprise
To find his young master with tears in his eyes.

x.

"I wanted your stocking," muttered Bud B;
"It's bigger than mine; boo hoo, I can't see,
And I'm all wet and cold," thus Bud cried aloud,
Until guests and his parents ran up in a crowd.

xi.

He was wrapped up with care and taken to bed,
But, strangest of all, not a harsh word was said.
He flattered himself as he fell fast asleep
That Hans and his friends the secret would keep.

xii.

Next morning when Christmas songs filled all the air,
Bud found, to his grief and boyish despair,
That his neck was so stiff he could not turn his head,
And must spend the whole day alone in his bed.

xiii.

What was worse, his stocking hung limp on a chair,
And on it these words in writing most fair:
"To him that is greedy I leave less than all;
The world is so large and my reindeers so small.

xiv.

"My pack 's elastic when children are kind,
But it shuts with a snap and leaves nothing behind
When a boy or a girl is selfish and mean,
Good-bye little Bud, I am off with my team.

SANTA CLAUS."

Teachers' Associations.

The publishers of the JOURNAL will be obliged to Inspectors and Secretaries of Teachers' Associations if they will send for publication programmes of meetings to be held, and brief accounts of meetings held.

SOUTH WELLINGTON AND GUELPH CITY.—The South Wellington, and Guelph City Teachers' Association met in the Public School, Fergus, on Thursday morning, the 17th November, at 10 a.m. Mr. G. W. Field, B.A., President, in the chair. On the meeting being called to order, the President explained that Mr. Ross, M.P., although on the programme, would be unable to attend, owing to other engagements. Mr. E. Roberts, Secretary, then read the minutes of the last meeting, which, in motion, were adopted. Miss Hoskin not being prepared to deal with

the subject of "School Discipline," the President requested Mr. Boyle to address the convention on that topic. He was not in favor of abolishing corporal punishment altogether, but would appeal strongly to the honour of the pupils. A plan which he has found very successful is, instead of detaining those after school for unprepared lessons, to let those who have done the required quantity of work go earlier than usual. A spirited discussion then took place, in which, though differing as to their method of applying punishment, were unanimous that corporal punishment is indispensable with school discipline. Mr. Nairn then introduced the subject of "History" in Public Schools, and showed his method of teaching it, making use of newspapers and stories in connection with text-books. Mr. Young thought that in preparing for entrance examinations there was not time for this method, but that the facts and dates had to be crammed as fast as possible. Mr. Clark was in favor of the period or epoch system. Noon having arrived, the proceedings were adjourned until 1.30 p.m. The first business in the afternoon was a paper on "Mental Arithmetic," by Mr. Moir, of Eramosa, in which he showed that mental arithmetic was greatly undervalued by teachers, and that enough attention was not devoted to it. He showed clearly how to teach the four elementary rules, laying especial stress in not allowing the pupils to leave addition until they could add by sight, and not by the use of fingers. Other methods; considerable discussion followed. The election of officers then followed with the following result:—President—Jas. Young, Fergus; Vice-President—Jas. Grant, Oustie; Sec.-Treasurer—David Nairn, Marden; Management Committee—Miss Budd, Miss Mills, Mr. Craig, Guelph; Mr. Hyatt, and Mr. Fenwick, B.A., Fergus; Auditors—Messrs. Cook, and Jennings. The surplus funds of the association were then disposed of by a resolution moved by Inspector Craig, authorizing the Secretary to furnish every member with a copy of either the CANADA SCHOOL JOURNAL or *Educational Monthly*, as desired. In the evening a public meeting was held in the High School, which was addressed by Mr. Field, the retiring President, and Dr. Bryce, of Guelph, who delivered an able lecture on some preventible diseases, and what we should know of them, bearing more or less on sanitary measures in school. *Friday, 9 a.m.*—The first business was the reading by Mr. Grant of a carefully prepared paper by Mr. Luttrell, of Eramosa, on the "Superannuation Fund." He contrasted those in the profession of teaching with those in the civil service, showing that a position in the civil service is not only more remunerative, but also permanent, and claimed that teachers should receive the benefits of the fund after teaching twenty-five years. A lively discussion followed, some advocating its entire abolition, while others favoured the twenty-five-year limit. To bring the matter to a head, the following resolution was moved,—That all teachers remaining in the profession for twenty-five years shall be then entitled to receive a retiring allowance; and further, that all leaving the profession before serving the twenty-five years, shall receive back all money paid into the fund, without interest.—*Carried.* The subject of "Promotion Examination" was then discussed, when it was resolved that they be continued in this Riding, and that the Inspector see to the carrying of them out. Mr. Grant, of Eramosa, then read a very interesting and thoughtful paper on, "Does the work done in our Public Schools conduce to popular culture?" The speaker considered the subject a most important one, especially to the teacher of the youth of the land. He believed that a moderate amount of well directed general reading would make a fairly cultured person of one who was endowed with common sense and shrewdness, and maintained that it was the teacher's duty to teach the pupils how to read understandingly, and (what was of great moment) what to read. In order to do so, the teacher must know books and how to use them. He spent two or three hours each week in hearing recitations, debates, and such like, and thought these helped to develop a taste for reading. The paper was well received. After some routine business, the association adjourned to meet at Guelph, at the call of the President.

DAVID NAIRN,
Secretary.

REVIEWS.

CHATTERBOX JUNIOR. R. Worthington, 770 Broadway, New York. This is a well got up, beautifully illustrated, and instructive book for juveniles. The contents are replete with attractive stories, descriptions of foreign lands and their inhabitants, anecdotes of animals, with their habits and peculiarities, gems of poetry, &c. The book is admirably adapted for a gift or prize, and is one that will be much appreciated by the happy girl or boy who is fortunate enough to get it.

CAT'S CRADLE. R. Worthington, New York. This is a book for the nursery, strongly bound, thick paper; funny and attractive, with striking illustrations. As its title suggests, the domestic feline pet enacts many extravagant parts; while other personages renowned in infantile lore make their appearance in new costumes and contribute to the entertainment of the little folks. The descriptive rhymes will complete their enjoyment of what is an excellent book of its class.

OUR LITTLE ONES and THE NURSERY. *The Russell Publishing Co., Boston.* It speaks volumes for the success of "Our Little Ones" that at the end of the first year of its publication it should have absorbed the old-time favorite "The Nursery". With Oliver Optic in the Editor's chair, Andrews for engraver, and the University Press, Cambridge, for Printers, there could be little doubt that the finest child's magazine in the world would be produced. Then with Mr. Sol Smith Russell, on the road to introduce it, it is not so great a marvel that in a single year, it went through all the grades and received the highest honors on "Commencement Day." Lee and Sheppard took 30,000 copies of the bound volume for holiday sale. Every girl and boy should see it. It cannot be described.

A life-size portrait of Ralph Waldo Emerson, uniform with the *Atlantic* portraits previously published of Longfellow, Bryant, Whittier, Lowell, and Holmes, has just been published. It represents Mr. Emerson not in his old age but in the full vigor of his manhood. To those who used to hear Mr. Emerson lecture twenty years ago or more, this portrait will recall the marked features and the personal appearance of one who then was, and who still is, a leader in American thought and letters. It cannot fail to be heartily welcomed by all those who have heard Mr. Emerson lecture, and by those who have read his remarkable writings; and must also be acceptable to those who, without personal knowledge of him or intimate acquaintance with his books, yet know that he is an honor to American literature, and sheds lustre upon the American name throughout the world. The portrait was prepared for subscribers to the *Atlantic Monthly*, to whom it is furnished for one dollar by the publishers, Houghton, Mifflin & Co., Boston.

AN ELEMENTARY TREATISE ON MENSURATION, BY G. B. HALSTED, A.M., Ph.D., Instructor in Post Graduate Mathematics, Princeton College, ex-Fellow of Johns-Hopkins University. 232 pp. *Boston: Ginn, Heath & Co., 1881.*—All the advantages derivable from mathematical studies may be obtained from the systematic study of Mensuration, whilst its practical utility is patent. But a mere compilation of rules is a poor affair. Logical analysis and proofs should be found in a complete treatise on any mathematical subject. The author of the above-named work gives clear and simple proofs of the various rules, introducing some theorems generally found only in books on Trigonometry or Integral Calculus. The earlier chapters contain applications of Euclid i., 47, rectification of the circle, and plane areas, including conic sections and spherical triangles. The formulæ for volumes refer to prisms, cylinders, cones, spheres, prisms, unguis, and solids of revolution solved by means of Pappus' Theorem. The investigation of the applicability of the prismoidal formula enables the student to group under one general principle the rules for volumes of hyperboloids, spheroids, cylinders, etc. Weddle's method of approximating to all surfaces is fully explained. The collection of examples for practice contains over 600 problems, each of which is a type of a class. Although Dr. Halsted has treated the subject in an exhaustive manner, yet the arrangement is logical, proceeding gradually from easy elementary principles to the most complicated problems. The only error that the author appears to have committed is that of using too many abbreviations in the reference tables. But this fault cannot cause much inconvenience to the reader. We can confidently recommend the volume as a valuable addition to our list of standard mathematical works. This publication reminds us that we are living in a different epoch from the olden time, when American mathematical works were remarkable for the omission of all difficulties.

SONG OF THE BROOK. By Alfred Tennyson, D.C.L. *Published by Estes & Lauriat, Boston, Mass. Price, \$2.00.* We have been favored by Messrs. N. Ure & Company, King St., Toronto, with a copy of this beautiful work. It is gotten up in a chaste and elegant style, which is very fashionable at present; and the illustrations are some of the finest specimens of the engraver's art. The several phases of the "Song" are pictured by some of the leading artists of the day, each picture occupying a page. This volume is the initial one of a series, which will be entitled "Songs from the Great Poets." We know of no way by which the descriptive portion of a poet's imagery can be more forcibly impressed on the minds of readers than by that adopted in the book before us.

POPULAR SCIENCE MONTHLY, Jan. 1882. If a teacher can afford to read one magazine, that one should be the *Science Monthly*. Its topics include a wide range, and they are treated in such a way as to keep the teacher up with the times. The widening of his scope, and the extension of his fund of illustrations will be worth far more per month than the Magazine costs in a year. "Earthworms and their wonderful works" is a review of Darwin's new book. It would startle the pupils in any school if the teacher could explain the nature and extent of the work done by the ordinary "fish-worm." "Astronomy in High Schools" is a brief article showing how a good teacher can easily interest a class in this subject. "Copyright Law," "The Chemistry of Tea and Coffee," "Sanitary Relations of the Soil," and "Volcanic Products," are among the most interesting of the numerous articles of this number.

MAGAZINES.

HARPER'S WEEKLY continues the interesting stories "Christowell" and "For Cash Only" and begins in No. 1303 a new story "Benighted Travellers" which bids fair to be as interesting as its predecessors, much valuable information is given in "The Cruise of the Alliance." The Giteau trial receives considerable prominence and is not too severely caricatured if it will draw attention to the evils of the "Spells System." The excellency of the art department is well sustained especially in the supplement to No. 1303.

LITTLE'S LIVING AGE for 1882. This widely-known weekly magazine has been published for nearly forty years, and during that long period has been prized by its numerous readers as a thorough compendium of the best thought and literary work of the time. As periodicals become more numerous, this one becomes more valuable, as it continues to be the most thorough and satisfactory compilation of the best periodical literature of the world. It fills the place of many quarterlies, monthlies, and weeklies, and its readers can, through its pages, easily and economically keep pace with the work of the foremost writers and thinkers in all departments of literature, science, politics, and art. Its importance to American readers is evident; in fact, it is well-nigh indispensable to those who would keep informed in the best literature of the day; and its success has therefore been uninterrupted. Its prospectus is well worth attention in selecting one's periodicals for the new year. Its clubbing rates with other periodicals are worthy of notice. Little & Co., Boston, are the publishers.

AMERICAN JOURNAL OF MATHEMATICS, Vol. 3, No. 4. An article on "Congruences," affording a generalization of the Algebraic Theorems of Fermat and Wilson, will be found of interest. Mr. Johnson, of Annapolis, Md., writes on the species of curves to which the strophoid or logocyclic curve belongs (polar equation, $y = a \sec \theta + a \tan \theta$). Prof. Sylvester shows how an irrational fraction may be developed into a series of fractions, each having unity for numerator; it is quite conceivable that practical value may attach to such expansions, and the ingenuity of the distinguished contributor makes the subject worthy of a place in our work on Algebra. Dr. Whitcomb treats of certain developments belonging to that inexhaustible subject, "Taylor's Theorem." Prof. Hyde, of the University of Cincinnati, has a quaternion treatment of centres of gravity of surfaces and solids of revolution. The subject of "Quaternions" is every year receiving increased attention, and it becomes a question whether they should not form part of the pure mathematical course in our Provincial University. To those who are concerned about the matter, an article on "Linkages" will be read with some interest.

AMERICAN JOURNAL OF MATHEMATICS, Vol. 4, No. 1, contains the following articles:—On the 34 concomitants of the Ternary Cubic, *Prof. Cayley*; On certain Expansion Theorems, *E. McClintock*; Some Theorems in Numbers, *C. H. Mitchell*; Note on the Frequency of Use of the Different Digits in Natural Numbers, *Simon Newcomb*; Tables of the Generating Functions and Groundforms of the Binary Duodecimic, *Prof. Sylvester*; A Demonstration of the Impossibility of the Binary Octavic Possessing any Groundform of deg-order 10⁴, *Prof. Sylvester*; Logic of Number, *C. S. Pierce*; Remainder of Laplace's Series, *E. McClintock*.

THE CENTURY MAGAZINE (SCHUBNER'S), January, 1882. A very fine tinted engraving of the great Frenchman, Mons. Thiers, forms the frontispiece of this number. The illustrated articles are: "A Provincial Capital in Mexico;" "The Revival of Burana Lace," very suggestive to ladies interested in household art; "Oriental and early Greek Sculpture; and "Who Were the Chartists?" In stories there are Mrs. Burnett's "Through One Administration;" Mr. Howell's "A Modern Instance," and a finished story "Old Madame"—all good. The Magazine begins the year well.

HARPER'S MONTHLY, January, 1882. A beautiful engraving forms the frontispiece of this old favorite. It represents the youth who entered the lion's den, to get the glove of the lady to whom he was paying his addresses, and who tested his devotion by flinging her glove into the arena among the lions, and challenged him to bring it to her. The story is told in the "Editor's Easy Chair." "Anne" and "A Laodicean" are each advanced a stage, and grow more interesting. Nearly every article in the magazine is profusely illustrated. Among those of most general interest are, "Journalistic London," Part IV., containing the portraits and sketches of the most distinguished newspaper men of London. This paper deals with the illustrated papers; "Young Men's Christian Associations," with eleven portraits; "King Coal's Highway," and "Ancient and Modern Glass of Murano." The short stories are excellent, and the "Editor's Drawer" even funnier than usual.