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The Canada School Journal.

Vol. VII.

TORONTO, FEBRUARY, 1882.

No. 57.

The Canada School Journal

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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.

REVISION OF THE PROGRAMME.

—A number of people have labored under the misapprehension that the Public School programme for Ontario was elastic to a much greater extent than it really is. For rural schools a certain very limited power has been given to inspectors and trustees to modify the programme in some of the subjects. Inspectors and School Boards in cities and towns have no such power to diminish the work prescribed by the Department. They may add to the prescribed work that which is optional, but they have no power to lessen it, nor do we advocate placing such power in their hands. We hold that the Department should issue two programmes, one for cities and towns and the other for rural districts, and that these should be prescribed. If licence is allowed to any but a very limited extent and for express reasons, many careless school boards would cut down the programme with the single view of securing a cheaper teacher. School Boards everywhere will do cheerfully what is laid down clearly as their duty by the Department, unless the Department oversteps the mark, and becomes tyrannical or arbitrary for mere whim's sake.

If it is the intention of the Minister of Education to revise the programme, we cannot give him better advice, than to urge him to follow the course pursued by Mr. Mundella in England. He first called to his aid a number of the practical educators of England and with their assistance prepared a "revised code"; which he afterwards submitted to a smaller committee of educational experts for revision. It was then placed before parliament with the understanding that it should lie over for a year before being passed, so that it might be subjected to the criticism of the entire country. In this way Mr. Mundella will get the benefit of the suggestions of all who have opinions concerning the code, and when it is passed it will be likely to prove satisfactory. We hope our Minister may make progress in the same deliberate manner.

FIRST CLASS CERTIFICATES.

—The letter of our correspondent in another column raises an important question. He is the representative of a large class who are among the best teachers in Ontario, and we fully sympathize with him in the view that professional skill and experience should receive a much higher recognition than is at present accorded to it. The teachers' section of the Ontario Teachers' Association passed a resolution at the last meeting in favor of this view. Unfortunately they did not indicate any plan by which so desirable a result could be attained. We recognize fully the difficulty of adequately awarding to ability and experience the position to which they are justly entitled, by any kind of certificate. We do not think that it is asking too much, however, to claim that as the professional First Class certificate is distinct from the non-professional First Class Certificate, the former should be placed on the same footing as the latter. At present the professional certificate is merely a subordinate matter. It cannot be obtained as distinct from the non-professional. Any school boy who has been crammed to the passing point at a High School may write for a non-professional First Class Certificate and get from the Department a statement to the effect that he has passed the First Class examination. This he uses in making applications for situations, and School Boards, who in many cases have given over attempting to understand the regulations of the Department, give him the preference over men of experience and ability, who have not been able to reach the First-class standard in some of the subjects. We do not ask that those who succeed in passing the non-professional examination shall not be permitted to receive from the Department the evidence of their success. We only ask that those who pass the professional First Class examination shall receive similar consideration. If this is not done, it need not be wondered at, that the professional examination and professional training will be regarded as unimportant matters by teachers generally. Surely no more disastrous impression could go abroad than this.

The Minister of Education only needs to look into the deserted halls of the Normal Schools to see the results of the present system of elevating the comparative importance of the non-professional work. The empty echo that comes in our Normal Schools to the question, "Where are the First Class Candidates?" should startle him. We hope he may ask the question, and that it may lead to a much needed change.

—We are pleased to note that W. S. Clendinning, Esq., has been appointed to the Inspectorate of Walkerton, in addition to his already important position of Inspector of Public Schools in Bruce County. This District was formerly under the Inspectorship of the Rev. Dr. Bell, who has been appointed one of the Professors in Queen's College.

THE CENTRAL COMMITTEE

-Two members of the Central Committee retire each year. Those whose term expired at the end of 1881 are Mr. Glashan, Public School Inspector, Ottawa, and Professor Watson of Queen's University, Kingston. They are both excellent men, wise in council and judicious examiners, and great care should be exercised in filling their places.

It is understood that the High School Inspectors will, in accordance with a suggestion made in Parliament last year, be made *ex-officio* members of the Committee for all but examining purposes. This is proper, but it makes it all the more necessary to select a good member to fill the place of Mr. Marling, who will by this arrangement cease to be an examiner. We hope to see good, sensible men appointed on this important committee who have no crotchets, and whose training has made them thoroughly acquainted with the Public School System of our country. If the Minister of Education decides that he must have High School and University men for examiners, it seems perfectly clear that very soon he must form a special advisory committee. It is of the utmost importance this year that the advisors of the ministers should be practical men as it is understood that the question of the revision of the Public School Programme will be considered by the Department.

INCREDIBLE!

It has been stated in the papers that two of the vacancies on the Central Committee are to be filled by Professor Hutton and J. Howard Hunter, M.A. It seems to us incredible that the Minister of Education could even think of appointing either of these gentlemen to positions on the Committee. To do so would be an insult to every teacher in Ontario, so deliberate and so unjustifiable that we are confident Mr. Crooks would not consider the matter for a moment. We can only account for the rumor on the supposition that some of the enemies of the Minister of Education circulated the statement for the express purpose of injuring him. Indeed, we understand the announcement was first made in a "monthly," one of whose aims since its birth, has been to misrepresent and attack the Minister, and as it betrayed a lamentable ignorance regarding the present membership of the Committee, we may safely conclude that its prophetic utterances are not more reliable than what it presents as a record of facts. The same article that announced that Messrs. Hutton and Hunter are the coming men, also stated that "Mr. Tilley is, and that Mr. Buchan is not a member of the Committee." As the latter statements are incorrect, let us hope that the former are also unreliable.

We have no hesitation in stating the reasons which lead us strongly to object to the appointment of the gentlemen named as members of the Central Committee.

Against Mr. Hutton our objections are purely of a negative character. As a man and as a scholar he is entitled to the fullest respect, and we cheerfully award to him our highest praise in these respects. We hold also that the members of the Central Committee should be gentlemen and scholars, and that so far Mr. Hutton is perfectly fitted for membership.

There are special qualifications for the position, however, which Mr. Hutton can not possibly possess. He is a foreigner and can not be sufficiently acquainted with Canadian schools to act in the capacity of an examiner justly to all parties concerned. However unfitted he may be for the post of an examiner, he is disqualified to a much greater degree for performing the duties of an adviser on educational questions. No one is competent to give counsel regarding the public school questions of any country who is not practically acquainted with the schools and their relationship to society, and all local circumstances directly or indirectly affecting them. What a force it would be for Mr. Hutton to advise the Minister of Education concerning the Public School Programme for instance. If objection was made to his appointment as a professor, to teach subjects of which he is master, how great will be the outcry, and how just, if he is called to give counsel concerning questions of which he can practically know nothing.

We object to Mr. Hunter for both positive and negative reasons. We can not say for him what we have said of Mr. Hutton. Even if Mr. Crooks wished to give him a prominent place in connection with the Education Department, Mr. Hunter would consult his own interests, if he is possessed of any feelings of delicacy, by refusing to accept it. There were many facts brought out during the investigation into Mr. Hunter's conduct in the Blind Asylum that were not commented upon at the time owing to his prompt removal from his position by the Government. These "arbor" scenes and others have not been forgotten, and the re-appearance of Mr. Hunter in connection with the Education Department, will assuredly stir them to life again, to the annoyance of himself and the Minister of Education.

Mr. Hunter is a man of some strength of character, but his strength is neutralized by his personal animosities, by an unfortunate acidity of disposition, and by his bitter partizanship. When he left the teaching profession, those in it breathed more freely and gave thanks. We know that we speak for the great majority of Public School teachers, High School Masters, and Inspectors when we say that the return of Mr. Hunter to official connection with educational matters would be a calamity, which could not be justified on any plea. The appointment of Mr. Hutton could only be justified on condition that the Committee ceased to have advisory functions; the appointment of Mr. Hunter would not be tolerated on any grounds whatever.

In conclusion we venture to make the strong statement that no Minister of Education, however popular he may be, can afford to surround himself with men like Mr. Hunter; and we express the hope that the day is far distant when the Education Department will be made a refuge for those who have failed to secure the confidence of their fellow citizens in much less important trusts.

If vacancies are to be filled an excellent opportunity is offered for popularizing the Department by securing responsible men, elected by the Public School Teachers, Inspectors, and High School Masters.

—A correspondent urges the desirability of having the marks obtained by candidates for First Class certificates issued to those who fail, as is done in the case of candidates for the Intermediate and Second Class Examination. The reason given for withholding the marks is, that no absolute standard is adopted for granting First Class certificates. The Central Committee varies the standard slightly according to the nature of the examination, and the publication of the marks might lead to much misunderstanding and unnecessary appealing. We think, however, that each candidate should be informed at least as to the subjects in which he made the lowest per centage of marks.

—Judging from the reports to hand we should presume that the state of the Schools in New Westminster, British Columbia, is highly satisfactory.

—In order to enable the provincial Teachers to shew fully the progress in Educational matters, in the province of New Brunswick, at the Loyalist Centenary, to be held in St. Johns, 1883, a vigorous effort is being made to secure an appropriation from the Local Government.

—ONTARIO BUSINESS COLLEGE, BELLEVILLE ONT.—The attendance at the Ontario Business College Belleville during the month of January exceeded 160 day students. In point of members this brings the college to the place of second largest on the continent — one in New York state only exceeding it—and in point of efficiency we know it takes the first place. Our knowledge of the institution and its principals is such as to warrant this assertion. A most interesting description of the college in session appeared in the "Intelligencer" recently.

✓ —An investigation into the charges made against Dr. May in connection with the management of the People's Depository was conducted at the Education Department during the early part of January, by Judge Senkler of St. Catharines. The investigation was conducted with closed doors. This has been unfavorably commented on in some quarters, but the result of the investigation with the evidence taken will doubtless be submitted to Parliament, and printed. Till this is done we refrain from any expression of opinion regarding the charges, or the method of investigating them.

—It is rather amusing to see in a journal, which makes constant claims to "highness and independence," that "Mr. Tilley is now leaving the Central Committee, and that Mr. Buchan is likely to be appointed to fill one of the vacancies on the Committee." Mr. Tilley has not been a member of the Committee since 1880, and Mr. Buchan has been a member for several years past, and still occupies the position. It would not be fair to expect the editor of that journal to know anything about the methods of teaching or the principles that underlie them, as he never was a teacher, but he might surely give some slight attention to the educational circumstances of the province in which he lives. We venture to say that none of the few readers, for whose enlightenment he writes, could show such a gross lack of knowledge as does the blundering editor. It must be remembered, however, that he is hired to adapt the matter of the magazine to its advertising pages. So long as he does that in a sufficiently slashing way his employers will not find fault with him.

—We record with much pleasure that S. Woods, Esq., M.A., late Head Master of the Collegiate Institute, Kingston, has received the appointment of Professor of Latin and Greek in the Academy in connection with the University of Lake Forest, Chicago. The emoluments consist of \$2000 per annum and 20 per cent. of the advance of the income over 1881, together with a free house and no taxes. Mr. Woods graduated in Toronto in 1862, with the highest honors in all departments, being gold medallist of his class. He has had nearly twenty years experience in teaching in Kingston, and as Professor of classics in Queen's University. He has published editions of Demosthenes' Philippics, Cicero, Cæsar, Virgil, and Horace. Although his removal is a loss to Canada we cannot but rejoice at his success.

—The letter from Mr. Clark, in another column, is one of much interest to those teachers who intend to enter the profession of medicine. We regard the action of the Medical

Council in adopting the Intermediate for their Matriculation Examination, as a step in the right direction. It saves expense to the student, prevents charges of favoritism, too often made when the examinations were in charge of one man, and secures a more uniform and a higher standard for admission to the Medical Schools. So far as the interpretation of the phrase, "the Intermediate Examination with Latin included," is concerned we know that it was originally intended to mean, passing the Intermediate by taking Latin as the optional subject in group four. It clearly means passing on the fixed groups in the same manner as other candidates, and taking Latin instead of French, German, or Philosophy, Chemistry, and Book-Keeping. It does not mean passing the Intermediate first, and then taking Latin afterwards, although a student who had passed the Intermediate without Latin could enter upon the study of medicine by taking Latin alone. It has been said that the Toronto Examiner under the old regulations, the President of the Teachers' Association of the Province, was the first to endeavor to raise difficulties in regard to the new rules. Loss of fees was of course his reason for not liking the change.

—We notice with much disappointment that the Senate of the University, while recommending a considerable addition to the number of professors, entirely ignores the subject of Education. We hold, that as the University is a part of our national system of education it should do more than merely complete the instruction of the comparatively few young men who enter its halls. It should improve the educational facilities of the entire school population of the country. It should be the centre of light and influence in all that pertains to systems and methods of teaching. It should be the beginning as well as the end of our national system of education. It should be the fountain from which one educational river should take its rise, and not simply a stream entering the river near its mouth. First Class Public-School Teachers, and High School Masters should in it be instructed in the history and science of education. Until this is done there will be a good deal of experimenting in comparative darkness in our schools. The training of teachers in the upper grades is lamentably defective in Ontario, and a reform is urgently needed. Would not the appointment of a Professor of Education in the University be the simplest and surest means of training both High and Public School Teachers beyond the point reached in the Normal Schools?

Correspondence.

To the Editor of the Canada School Journal:

SIR,—I have to thank you for inserting in your JOURNAL a former letter written by me pointing out a number of errors in one of the Geographies authorized for use in Ontario. I sent the same letter to the *Educational Monthly*, but though it pretends to be a teachers' journal my letter was not inserted.

I now send you a number of errors to be found in connection with our own province alone in Campbell's Geography. I have not used this book myself, and would probably not have discovered the gross blunders it contains, but for the fact that in a single lesson nine mistakes were made by my pupils, which they attributed to Campbell's Geography, the work which I found in my school. On examination I found that the pupils had answered in accordance with the instructions contained in their text-book. I was led to look more closely into the book and I find it literally teeming with errors even in the portion devoted to Canada itself. I am amazed that it should ever have been authorized, and I believe that teachers only need to have their attention called to the mistakes it contains to lead them to recommend the withdrawal of a book which seems to have no good quality to recommend it.

Yours truly, HIGH SCHOOL PRINCIPAL.

We refer our readers to the *Review Department* of this JOURNAL for an analysis of the part of Campbell's Geography referred to, which contains most of the mistakes sent us by our esteemed correspondent.—ED. OF JOURNAL.

THE INTERMEDIATE AND MEDICAL MATRICULATION.

To the Editor of the Canada School Journal :

DEAR SIR,—Will you kindly procure a final decision as to the meaning to be attached to the words in the declaration of the Medical Council: "Every one desirous of being registered as a Matriculated Medical Student must present to the registrar the official certificat of having passed the High School Intermediate Examination, with Latin included?" Will the authorities kindly explain whether this means: A.—That the intending matriculant must first pass that branch of the Intermediate Examination in which Latin forms an essential part? or, B.—That he must pass in (1) the French, or (2) the German, or (3) the Natural Science section of the Intermediate, and, in addition to passing any one of these, according to his choice, pass in the Latin prescribed for the same Examination? I observed that in the Canadian Almanac for 1882 Trinity College authorities are represented as interpreting the ambiguous declaration as meaning that the would be Matriculant may take his choice between passing the Intermediate Examination in the French or in the German section, and must then take the Latin for the Intermediate.

Is there any authority for omitting the Natural Science from the list of optional subjects, or is it not rather the intention that the student may elect to take (1) French, or (2) German, or (3) Natural Science, as prescribed in said examination, and is then under obligation to take the Latin also?

Upon this latter supposition which seems to be the natural meaning of the words, I would like to know why the Hon. Minister of Education may not amend the regulations so as to allow pupils to take the Intermediate Examination in Latin at the same time as they take examination in the French, German or Natural Science Department, according to their declared wish.

If there ever was any propriety in preventing a candidate from trying the examinations in two departments at one examination surely the rule may be relaxed in favor of pupils who may wish to matriculate in Arts, Law or Medicine. All that is necessary is to allot a different half-day in the Intermediate Examination to Latin from that on which the candidates may be taking the French, German and Natural Science. As at the last Intermediate Examination, French, German and Natural Science fell on one half-day and Latin upon another. I hope the regulation referred to will be amended, as I have suggested, previous to the next Intermediate Examination.

Yours &c.,

J. A. CLARK, H. S. SMITHS FALLS.

To the Editor of the Canada School Journal.

SIR,—As an instance of the practical benefit to be derived by teachers from perusing the JOURNAL, I wish to mention the method of Prof. Peaslee (as explained in the December number), which I have adopted in my school. For example, we spend five minutes every morning before commencing regular work in repeating the verse:

Hearts, like doors, will open with ease
With very, very little keys,
And don't forget that they are these:
"I thank you, Sir," and "if you please."

This, with the verse following, is sufficient for one, or in the junior classes, two weeks. The lesson to be thoroughly impressed on the minds of the pupils, may be deducing a prose maxim or two; for instance, the week following I give my class: "It is too often the case in this country that young people do not know how to be polite and respectful. To be polite means to be unselfish in heart, and to be kind and courteous to everybody. True politeness with refinement of manner marks the true gentleman and the true lady," &c.

This may be altered by the teachers to suit their respective classes in each division of a school. These prose morals or maxims should be short, clear, and as thoroughly Anglo-Saxon as possible, so that the youngest pupil may experience no more difficulty in mastering them than it has in learning the Lord's Prayer. Short but effective lessons can thus be given (with the aid of our standard Poets) in honesty, benevolence, temperance, and, in fact, in every subject comprised in the "Christian Morals" so strongly insisted on by many clergymen as being a necessary part of our Public School Programme. I believe that some such plan as this is calculated to improve the morals and manners of the average school-boy to a considerable extent.

Impoliteness is considered by many to be a matter of very little moment, and in this busy age is too often lightly passed over. Contempt for the human is sure to lead to indifference to the divine, and may we not seriously inquire whether much of the socialism, agnosticism, &c., of the present day may not be a natural sequence to the selfishness and disregard for the principles of true politeness so largely prevalent amongst the present generation?

TEACHER.

PARKDALE, January 28, 1882.

To the Editor of the Canada School Journal:

DEAR SIR,—Allow me to call attention to an anomaly in the regulations affecting candidates for certificates.

When a candidate for a First Class Certificate tries both the professional and the non-professional and fails in the latter, he is refused any information about the results of his work in the former, and must write at the professional again, even when his work is very good. If he is a Normal School student, good teaching in the Model School does not give any higher standing. But, if a candidate having very little experience in teaching, succeeds in passing the non-professional examination, he receives credit for it, which gives him an advantage in applying for a situation, and enables him to give his whole attention to reading for the professional. The tendency is to discourage experienced teachers who try to gain higher certificates, and to favor those who are fresh from the High Schools and do not trouble themselves about professional training. It is no wonder that there are no students in the First Division at the Norman School this term. Is there any good reason for attaching so much relative importance to the non-professional part of the work?

Thanking you for giving me the opportunity to make this enquiry,
I am, yours truly,

STUDENT.

We have received many letters commending our course in "lifting the veil" in the last number of the JOURNAL. We give the following as a sample:—

To the Editor of the Canada School Journal.

SIR,—I feel that the teachers of Ontario owe you a debt of gratitude for "lifting the veil" from the grasping "syndicate" who under the guise of independence have been attempting to throw dust in the eyes of the public in order to advance their own selfish interests. It has long been a matter of surprise to me that any one could be deceived by the pretence of G. Mercer Adams and the small ring of publishers and High School Masters whose tool he is. I hope you may complete the work you have so well begun. You will have the sympathy of the great body of teachers in doing so.

Yours &c.,

HIGH SCHOOL MASTER.

Mathematical Department.

VICTORIA UNIVERSITY MATRICULATION.

SEPTEMBER, 1881.

ARITHMETIC.

Examiner—J. A. McLELLAN, LL.D.

1. Prove the rules for pointing in multiplication and division of decimals.

Simplify $\frac{2}{3}(3\frac{1}{2} + 1\frac{1}{2})L. + \frac{1\frac{1}{2} - \frac{1}{2} \text{ of } 1\frac{1}{2}}{\frac{1}{10} \text{ of } 3\frac{1}{2} + \frac{1}{14} \text{ of } 1\frac{1}{2}} \times 475 \text{ of } \frac{8}{5} + \frac{4 \cdot 2}{0.12}d.$

2. The value of the paper required for papering a room supposing it to be 27 in. wide and 9 cents a yard, is \$10.35; what would the cost be if the paper were 2 ft. wide and 8 cents per yard?

3. Define the terms *measure*, *multiple*, *common measure*, *least common multiple*.

The L.C.M. of two numbers is 634038944494; their G.C.M. is 9187; one of the numbers is 85044059, find the other.

4. Define *ratio* and *proportion*. Prove that the product of the extremes is equal to the product of the means.

A grocer has 630 lbs. of a mixture of chicory and coffee, the coffee being to the chicory 4:3; what amount of coffee must be added to the mixture to make the ratio 10:7?

5. A person discounts a note due in 15 months, so as to make 10 per cent. on his money; what per cent. on the face of the note does he exact?

6. If 4 men earn as much in a day as 7 women, and 1 woman earns as much as 2 boys; and if 6 men, 10 women, and 14 boys earn \$110 in 8 days, what will be the earnings of 8 men and 6 women working together for 10 days?

7. If a person has a certain capital, 40 per cent. of which he invests in $3\frac{1}{2}$ per cent. stock @ 90, the remainder in 4 per cent. stock @ 95; his total income is \$1340. Find the amount of his capital.

8. Find the weight of a spherical iron shell whose internal diameter is 5 in., the thickness of the metal being 1 inch.

9. Find the area of a trapezoid, whose parallel sides are 27.5 yds. and 38.5 yds. respectively.

10. A man bought property for \$9000, and agreed to pay principal and interest (compound) in four equal annual payments. Find the annual payment, interest being calculated @ 6 per cent.?

EXAMINATION QUESTIONS

SUITABLE FOR

INTERMEDIATE EXAMINATIONS.

ALGEBRA.

1. (a) Prove that $-bx - d = +bd$; divide
(b) $a^2(2x-y)^2 - a^2x^2(x+y)^2 + (x+y)2ax^4 - x^6$ by $a^2(2x-y) - ax(x+y) + x^2$;
(c) and show $(a^2+b^2+c^2)^2 = 2(a^4+b^4+c^4)$ when $a+b+c=0$.
2. (a) What is the value of $(a+b)$ when $a^3+a^2b+ab^2+b^3=0$?
(b) What number squared will produce $a^2\sqrt{2} + a^{-2}\sqrt{2} - 2$?
(c) What is the value x^2+x^{-2} when $x+x^{-1} = 3$?
3. (a) $\frac{1}{1+x^{m-1}+x^{m-2}+\dots+1} + \frac{1}{1+x^{m-1}+x^{m-2}+\dots+1} + \frac{1}{1+x^{m-1}+x^{m-2}+\dots+1}$
(b) $(x^n-1) \div (x-1)$. Give the first three terms and the last three terms of the quotient.
(c) $a \times 0 = 0$ and $b \times 0 = 0 \therefore a = b$. Discuss this statement.
4. (a) If $a^2 + b^2 = 0$, show that $a = 0$ and $b = 0$.
(b) $(b-c)(c-a) + (c-a)(a-b) + (a-b)(b-c)$ is always negative when a, b and c are real and not all equal. Prove
(c) $x^3 + y^3 - x^2y - xy^2$ is positive when x and y are positive and unequal
5. (a) Solve $\sqrt[3]{1-2x} + \sqrt[3]{1+2x} = 3$
(b) $\left(\frac{x}{x-1}\right)^2 + \left(\frac{x}{x+1}\right)^2 = n(n-1)$
(c) $\sqrt{a^2+cx} + \sqrt{a^2-cx} = \sqrt{2acx}$.
6. (a) Factor $(b+c-a-x)(b-c)(a-x) + (c+a-b-x)(c-a)(b-x) + (a+b-c-x)(a-b)(c-x)$.

(b) If $\frac{a-b}{b-c} = \frac{a}{c}$ show that $a^2 + c^2 > 2b^2$.

(c) Factor $1 - \left\{ \frac{a^2+b^2-c^2-d^2}{2ab+2cd} \right\}^2$.

7. (a) Find the G.C.M. of $(ax+by)^2 - (a-b)(x+z)(ax-by) + (a-b)^2xz$, and $(ax-by)^2 - (a+b)(x+z)(ax-by) + (a+b)^2xz$.

(b) If $\frac{a}{b} = \frac{c}{d}$ show that

$$\frac{1}{ma} + \frac{1}{nb} + \frac{1}{pc} + \frac{1}{qd} = \frac{1}{bc} \left\{ \frac{a}{q} + \frac{b}{p} + \frac{c}{n} + \frac{d}{m} \right\}$$

(c) If $a^2+bc)(b^2+ac)(c^2+ab)^2 = a^2-bc)(b^2-ac)(c^2-ab)^2$ then either $a^3+b^3+c^3+abc=0$, or $\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} + \frac{1}{abc} = 0$.

8. A rectangular garden, sides = p and q , has a path along the inside of its perimeter, width = r . Express the area of the path in terms of p, q , and r .

9. I went 56 miles on a railway, and the remainder of my journey on a stage. The train ran $\frac{1}{4}$ of the whole journey in the same time the coach travelled 5 miles. When I arrived at home the train was 35 miles beyond the station at which the stage left me. Compare the rates of the stage and the coach.

10. A sum of money, \$ P , is left to A, B , and C , so that as each comes of age at the end of a, b , and c years, he may have the same amount. Find their shares if the money be divided now.

Contributions.

PHYSICAL EXERCISE.

BY ALFRED CARPENTER, M.D. (LOND.), C.S.S. (CAMB.), VICE-PRESIDENT OF THE BRITISH MEDICAL ASSOCIATION.

The narrow view of the function of the school-master is well exemplified in some schools by the entire banishment of physical exercise from the rota of school work. We send our children to school for the purpose of training them for the battle of life, which they will have to encounter when they reach to man's estate. It is by the equal and continuous development of each and every part of the body that this battle will be fought with success, and if one part develops at the expense of another, or by its more rapid development puts a bar to the progress of the others, the subject of it is at disadvantage in his future struggles. Many a Cambridge wrangler and Oxford first-class man has found this out in after life. He is able to solve a problem in differential calculus, to make Latin verses, or to read a passage in any of the dead languages at sight, but he has not cultivated the talent of common sense, or educated his muscles so that they can enable him to leap over some slight impediment in his path. He finds himself outstripped in the daily race by men whom he has been taught to despise, and who, in return, have a very small opinion of him and his mental power. The nerve force of thought in his brain has been developed at the expense of his motor power, and as the room for growth is limited, the later is dwarfed and imperfect. Life is 'organization in action,' and the various functional activities of the body must be carried out with normal energy and in a harmonious manner, if they are to be correct in their responses to any and every call that may be made upon them. Physical exercise is indispensable, and it is quite impossible for the functions of respiration and circulation to be carried on in a proper manner if the muscular system is not developed, and if the material which is necessary for the formation of the muscle is not used up in its proper order. If the muscles are not used equally with the brain tissue, some used up matter is kept back, and will sooner or later act as an impediment to proper brain work, by getting in the way of the latter when it requires all the room which ought to be at its command. The assimilative and disarranging processes of the body are greatly influenced by the activity or inactivity of the muscular system. Hence it follows that no school is properly constituted which does not provide an exercise ground for its pupils, and make the cultivation of muscular force a part of its daily routine. This is not the place to deal with the general effects of exercise, but it will not be out of order to call to mind the fact that, the natural heat of the body being 98.4; it follows that something must be produced in the blood which is the

débris of the continuous fire that is always burning, and by means of which the natural heat of the body is kept up to its proper standard. The principal product in this manufacture is carbonic acid (CO_2). The daily amount expired, as I have already shown, is very considerable, it is produced, in a great measure, *in situ* and must be removed from the body. The larger the quantity remaining in the tissues of the body, the more impure is the blood; and the smaller the quantity remaining behind, the nearer the blood is kept to its normal standard. Now it has been proved that taking the quantity expired during rest in the recumbent position as 1, or unity, there has been expired when a person is sitting, 1.18; standing, 1.33; walking one mile an hour, 1.9; walking two miles per hour, 2.76; walking three miles an hour, 3.2; riding on horseback, 4; walking at four miles per hour, 4; running at six miles per hour, 7. Thus it is seen that the quantity excreted is increased seven times whilst running quickly, as compared with rest in the recumbent position. In connection with this elimination of CO_2 , there must be a corresponding increase in the absorption of oxygen, and greater ability to maintain the animal heat at its normal standard, without requiring a warmer atmospheric air to live in. It will be easily understood by this one illustration how it is that exercise in the coldest air is accompanied by increased warmth. The union of the oxygen with the carbon, which is set free by the process of assimilation constantly going on in the body, and which union takes place in the muscular system more acutely than in any other part of the body, produces a warmth of a most decided character, and which production does not cease with the cessation of the exercise. The manufacture of warmth in this manner is very advantageous to children, and any complaining of cold should be persuaded to warm themselves by the combustion of carbon in their own frames, rather than be encouraged to obtain it by warm rooms and hot bottles to the feet, blazing fires, or any other means than by producing warmth within themselves.

There is also another aspect of the case, muscular tissue wastes during long continued rest. Any person may find this out for himself if he notes his muscular power before and after a few days of enforced confinement in bed; and there is no doubt also of the growth and increased strength of muscle by exercise. If any man changes his occupation, say from a clerk to a blacksmith, the comparison of power in the muscles of his arm at the end of a year will be found to prove this statement most efficiently, but if the blacksmith gives up his anvil and takes to the pen, within a year the powerful deltoid muscles which he formerly possessed will be dwarfed and comparatively impotent to power. Let a man or a boy have sufficient intervals of rest between his times of labor, and whether that labor is brain work or muscle work, it will tend to increase the power of the organ exercised, and the action of the one will by its own work clear the blood from the *débris* which has been produced by the work of the other. The more powerful minds will therefore be found among those men who do not neglect their muscular development, whilst the total neglect to mental work, which bodily labor sometimes compels the sons of toil to submit to, keeps them at a lower level in the scale of humanity than will be the case when both organs are allowed a chance by being worked alternately, as they ought to be in every well-ordained school. We must bear in mind that by exercise the individual fibres of a muscle increase in size, new molecules are developed from what are called the connective tissue corpuscles, which lie in the interstices between the fibres of the muscle. The contraction of the muscle is one of the means by which an ample supply of blood is brought for the nourishment of the new tissue. If this exercise is not forthcoming, the tissue dwindles and becomes fatty in its character, loses its proper elasticity, and does not leave room for new cells to take its place, for it is not removed in the way that a regularly-exercised muscle is. The elaboration of new muscle is the immediate effect of the activity of the old, and if the old is not used, it fails when a sudden call is made upon it.

It is, however, possible to carry on exercise to too great an extent, and whilst some schools ignore the necessity, others go on the wrong principle and carry it on to excess. So long as muscle conforms to what is called the principle of rhythmic nutrition, its bulk and effective power increases; but long-continued over-exertion tends to induce a condition of chronic exhaustion, ending in wasting and decay. There must be time between the movements for the removal of *débris* and for the recharging of the battery of nerve power which directs the movements; otherwise the symptoms which indicate muscular exhaustion come on. These are sometimes very marked when exertion is confined to a very small class of

muscles. It is sometimes so marked as to constitute a distinct disease, and is called by various names, as scrivener palsy, type setters', violinists', tailors', or milkers' cramps. Various trades in which only one set of muscles is used, and used continuously for many hours together, are subject to these conditions. The causes which produce such states give us insights into the conditions which are to be avoided in the playground. "Professional muscular atrophy" is the result of a condition which is the opposite to non-use.

Besides the muscles which may suffer from over exertion, the blood vessels are liable to injury. Foundations are laid for mischiefs later on in life, and dilatation of the cavities of the heart, or of the large blood-vessels allow of aneurism being set up, or the smaller arteries and veins give rise to a state corresponding to varicose veins in the leg, which are the result of too long-continued muscular exertion. Athletic exercises, therefore, may be in themselves sources of danger, and violent and long-continued work, either at cricket, or boating, or at football, or in the racket-court, must not be allowed at all to those who are not trained to it, and who have not gradually brought their powers into accord with the work they are called upon to perform.

There is an outcry at times against the continuance of violent athletic sports. It seems to me highly undesirable that they should be abolished; they ought, however, to be carried on under regulations which the monitors and masters in the school should enforce. These pastimes, when carried on in large assemblages of young men, should be under regulations supervised by a responsible officer, and racing crews, football teams, and cricket elevens, intending to enter into contest with other similar parties, should be picked out from men who have been gradually inured to the work, and who have not been absent from proper drill for any length of time together. A boy has, perhaps, been away from school on account of illness or for some temporary cause; and after an absence of two or three months, on his return takes his place at the head of his team, he enters at once into some contest in which there is a call for sudden and long-continued exertion, the result is the foundation for a disease of the heart, or dilatation of some artery, which produces aneurism at some later stage of his life, or some other strain arises, the effects of which are permanent. Extreme exertion embarrasses the heart, the flow of blood is impeded from the right side of it, for the increased pressure of air from the inner surface of the air-cells impedes the flow of blood through the lungs. These air-cells are sometimes ruptured, and that happens in the boy which is recognised in the horse when a state of things arises which leads to the condition called "roaring." If there has been a proper training, this does not arise. The individual is said to have gained his "second wind;" he breathes regularly, and, under heavy and long-continued exertion, goes on properly, and he is enabled to continue up to the limits of muscular exhaustion, unless stopped by a stitch in his side. This stitch arises from the liver becoming engorged with blood, and it is unable to transmit the quantity through it which rapid exertion has brought into the venous system of the lower extremities and the bowels.

The skin flushes during active exercise, there is congestion of the cutaneous vessels, and perspiration results. This action keeps the temperature of the body at its normal standard. If the skin acts imperfectly, the accumulated heat excites languor and indisposes to further exertion, just as in the case of the lungs. If the boy is in good training, the circulation goes on properly. There is not profuse perspiration, but only sufficient to carry off excesses of heat. It is important, however, for boys to beware of the dangers which may result from the custom of trying to cool themselves when too hot, by allowing evaporation to be as rapid as possible. A large loss of heat takes place in this way. The pores of the skin are suddenly closed by the cold, and the discharge of the *débris*, which was taking place with the sensible perspiration, is stopped; the excretion is thrown back into the circulation in a state which does not belong to it, and, as a consequence, a condition arises which is called "taking cold." It really is a state of self-poisoning by returning into the circulation some morbid matter which ought not to be there at all, and which the skin was naturally excreting. When a boy is hot, it is better not to allow this gradual chilling to take place upon any account whatever. If he has been running just before he goes into his bath, let him strip and plunge in as quickly as possible, and come out again in a very short time. The bath will refresh him, and the reaction will bring back to the skin that which was being excreted; but if the vessels are allowed to be cooled too much, they will not again relax, and there is no power

to continue the process of exertion in a proper manner; the boy continues languid and tired, and it may be that a serious illness is set up. It is unwise to go into the water when in a great heat at all, unless a sudden plunge in and out is alone indulged in, in which case there is a refreshing action, but boys, as a rule, should not take violent exercise just before bathing.

Just as particular muscles may suffer from professional atrophy, so certain parts of the brain may suffer in a similar way. If a boy is kept at one form of work too long—say if he is not allowed to do anything else than try to solve some of Euclid's problems, or if he sets himself to do some such task—it is possible that there may be over-strain of that particular part of the brain upon which mathematical power may depend, and such an one will never become a reasoning genius.

Brain-work must have its rhythmical movement, as muscle. There must be time for the removal of used up brain matter, time for the renewal of new tissue, and for the recharging of the nerve battery, which has been used up in the work which has been done. Teachers are great sinners in this respect. They neglect physical exercise themselves, and, as a consequence, get a low standard of health, suffering as much as most men from these conditions, which are styled bilious, and which they connect with indigestion, but which really arises from the retention within their circulation of the *débris* of nerve tissue and the remains of used-up nerve force.

Space will not allow me to go into the different forms of exercise, or to analyse the muscular movements which are brought into play in each kind. The cultivation of muscle is being recognised as a part of school work, and each in its turn becomes a useful part of muscular training. "Training," says an eminent writer, "is to put the body, with extreme and exceptional care, under the influence of all the agents which promote its health and strength, in order to meet extreme and exceptional demands upon its energies;" but I have met with instances in which so-called "training" has done everything but this. It has not promoted health and strength, but has exhausted the bodily power, and done more mischief than good. The course of training which is recommended by the fast men of University life, or by the pugilists of fifty years ago, is not the training which boys and girls ought to submit to, except so far that the habitual use of intoxicating liquors is rightfully and reasonably prohibited; and stimulants are in no case required to produce a development of either mind or body. The requirements of a growing body are not the same as those which belong to the adult. In the one case, muscular exercise is used for the purpose of development; in the other, it is used to remove the *débris* which arises from the act of living, and in order to preserve the constitution from the dangerous result of the oxidation of this *débris* in the wrong place and at the wrong time. If one set of muscles develop in the child, and not the other, there is distortion of frame and a want of grace and of elegance in movements. The chest may be contracted, and the lungs deprived of the room which they ought to have for the necessary purification of the blood. Gymnastic and calisthenic exercises tend to produce a straight back and an upright figure; the avoidance of them may lead to round shoulders, twisted spine, stooping and shuffling gait, and shortness and imperfection of vision. The curvatures of spine which are common to young girls in consequence of the want of exercise, lays the foundation of much of that mortality, or, at the least, of the acute suffering which follows upon child-bearing later on in life. Spinal curvatures are more common amongst girls than boys, because the latter do get more natural exercise than the former.

SHOULD CORPORAL PUNISHMENT BE RETAINED IN OUR SCHOOLS?

SUBSTANCE OF A PAPER READ BY STEWART MULVEY, ESQ., CHAIRMAN OF THE PROTESTANT BOARD OF SCHOOL TRUSTEES, AND MEMBER OF THE BOARD OF EDUCATION, BEFORE THE MANITOBA TEACHERS' ASSOCIATION, WINNIPEG.

As the duties of teachers and the discipline which should obtain in our schools are so closely connected with the question selected

for discussion, that you will pardon me if I refer briefly to both. The duties of school teachers are to train up and educate the youth of our lands, develop their mental powers, fill their minds with such useful knowledge as will raise them to a state of civilization and refinement, so that when they arrive at mature years enter forth into the world and battle with its cares, by the instruction received at their teacher's hands; they become better men, useful citizens of the world, an honor to themselves, a blessing to their parents, and a credit to their teachers. The office of teacher is consequently an important and responsible one, and he occupies a most peculiar position in society; with the young and irrepressible mind spread out before him as a pure tablet upon which he may write what he will, with a virtuous mind to be cultivated, and all his future destiny to a great extent to be moulded by him. Should the teacher neglect his duty, when the time arrives when he shall be called upon to give an account of his stewardship I cannot see how he can do so with a clear conscience. The personal influence of the faithful and zealous teacher marking its deep impressions, unconsciously operating in every word of encouragement or reproof, trains the youthful mind to yield to generous impulses and develops into salubrious activity the moral principles, without which education, instead of a blessing, would become a curse.

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Then for the teacher to discharge his duties zealously and efficiently there must be proper government and discipline in his school. Without these all his labors are in vain. In fact there must be authority in all good organizations; and there must of necessity be submission to that authority. Authority which cannot enforce itself is utterly valueless. All admit that in society and good government law must be enforced, and this is certainly no less true in the school room. The rules must be obeyed, and to say that those who cannot be persuaded to obey must be suffered to disobey is to strike at the root of all good government. We must observe that learning knowledge—knowledge of things is not the sole object of teaching. If the child in school never learned one fact or principle in knowledge, would he have been idly employed if he acquired a proper discipline of heart and mind and body? If it brought his body to regular habits, his mind to think his heart to feel right emotions, would not one of the greatest objects be obtained? What would our noble army and navy be without British discipline and its excellent army regulations? It is said by historians and confirmed by the gallant Nelson himself, that a great deal of his success in the many hard fought battles, in which he which he was engaged, and the victories which he attained, might to a great extent be attributed to the severe discipline which he was compelled to undergo while attending his own village school. And was not the brave iron Duke himself a strict disciplinarian? Was it not strict British discipline which battered down the walls of Torres Vedras, and scattered the French forces at Waterloo, and sent the great disturber of nations, the mighty Napoleon himself, to the solitary dungeon at St. Helena? And at a later period, was it not the same discipline which the renowned Napier enforced which led his forces to surmount all difficulties and overcome the almost insurmountable barriers of Ethiopia to storm the walls of Magdala, disperse the blood-thirsty forces of Theodore and set British prisoners free? And later still, was it not the same discipline which enabled the gallant and renowned Wolseley to conduct the first expedition of Canadians over fifteen hundred miles of mountain, lake and woods, from Toronto to Winnipeg, without the loss of a single man? I make bold to say, without assuming the name of prophet, that this comparatively new Dominion of ours stands in danger from no cause so much as the want of discipline in the young men at our schools, those whose future actions shall bright or dim our country's glory. * * * *

But how is this discipline to be secured? This brings me to the consideration of the question proposed for this afternoon's consideration. The question of how to best insure correct discipline in our schools, or whether corporal punishment ought to be resorted to in cases, is one which is attracting the attention of educationists in this country and the United States. By the wisely framed school laws of this Dominion the teacher stands to the pupil *in loco parentis*, he is the substitute for the parent, and is charged in part with the performance of his duties. Within the sphere of his authority, like the parent in home government of his child, the teacher is the judge, when correction is required. And like all others he is entrusted with a discretion and cannot be made personally responsible unless he administers unreasonable correction and then neither parent or teacher is permitted by our laws to abuse a child. I do believe that the different degrees of tempers and passion of little ones render this power in teachers' hands necessary, and let us not suppose that there are not teachers and parents whose passions often present them in exercising that prudence and sound judgment by which they should be governed in cases which require corporal punishment. But when we look over the whole of the Dominion of Canada with nearly 13,000 teachers, and see how few complaints are made against them in the exercise of this power, and how seldom they are brought before courts of law, we are compelled to believe that teachers are rather to be admired as a body for humane treatment of pupils than to be condemned for unreasonable severity. On the contrary, if this were the only test of their discipline, we should be afraid that they rather fell short of than exceeded their just powers of government, as administered in our schools, is not so frightful a thing after all, although in the minds of some it is considered nearly as bad as capital punishment itself. Wherever it is administered cruelly or severely, it is an evidence that the teacher is unsuitable for his office, and should not be retained for a single day. But, then, if it were abolished, a harsh teacher has other methods of indulging in severity, many of them far more objectionable than the milder form of corporal punishment as practised in our schools. If the power to inflict corporal punishment were taken out of the teacher's hands, are there not many other means of torture, and, I might say, cruelty, far more objectionable practised in those schools which are pretended to be governed by love. Deprivation of recess is injurious to the health of the pupil, who more than any other requires the pure air or the opportunity to get rid of the superabundant energy of his nature that, pent up in the school room, perhaps drives him to commit the mischief for which he is punished. Expulsion or suspension from school is often suggested as solving the difficulty, but they who rely on this, as it seems to me, can hardly have considered the usefulness of education, and the necessity for all to be brought under the privilege of acquiring it. The object of our Manitoba school law is that all the children should be received in the school room and derive its benefits, not that they should be expelled from it. Therefore, very weighty objections lie in the way of this mode of punishment. Again, there is something exceedingly repulsive in holding up a pupil to ridicule before the whole school, such as tying their hands behind their backs, standing upon one foot, and numerous other means resorted to by teachers to enforce discipline. Many a person, perhaps, dates a life of shame and suffering back to the hour when, a sensitive child, he was made by his teacher, for some trifling fault, the laughing stock of the whole school. Detaining a pupil after school, I find by experience to be no substitute for corporal punishment, as it often produces family inconveniences, and punishes the offending teacher as well as the guilty pupil, and right well the little urchins know it.

In extreme cases where teachers meet with unruly pupils, possessed of such angry passions, where preaching, and coaxing, and friendship are ineffectual. I would advise all teachers to try what virtue is to be found in an external application of that social science Sermonizer—the rod. I know by experience that with such children a tincture of ferrule does a vast amount of good. And so long as my common sense tells me that some of my pupils are the better for it, so long will I use it. The wisest of men, Solomon, King of Israel, tells us that "he that hateth his own rod," and who will have the hardihood to say that Solomon was not fit to be a school teacher. Some parents will say "oh, don't punish my children, they seem to be so much afraid," others will say "flog them," "lay the gad on," &c. After carefully listening to all these wise suggestions, together with many more, to all such I make one reply, and that is, that after mature consideration, aided by nineteen years' experience in teaching, I have come to the conclusion that where my judgement

tells me to govern by love, I invariably do so, but that where children are too often neglected at home, and that necessity requires that the rod should be called into requisition at school, I will never refrain from so doing, and I always am sure to let the pupil know this. If ever I entertained the opinion that pupils should be governed solely by love, I assure you, gentlemen, that I have long ago given it up, because I always found that a school governed by love was like a ship without a rudder, perfectly unmanageable and liable to be tossed to and fro. The master must deal with human nature as he finds it; the great God himself did not make all human beings with tempers and passions alike, and so long as humanity is possessed of uncontrollable dispositions, so long will transgression require severe chastisement. Compare the school room to the world we live in, and dispense with all laws and penalties, and what, I ask, will the world come to? The laws of our country have very wisely given to the teacher power to inflict corporal punishment, and let us all be careful not to abuse it, and depend upon that if we only exercise it cautiously. All good thinking parents, school trustees, superintendents, school officers, and the high courts of our country, will sustain us, and prevent all undue interference in the discharge of our duties. The day may come, but I confess it is a long way in the future, when the application of the rod will be unnecessary, when teachers and parents will be able to govern by moral suasion, but that must be at the time when "the lion shall lie down with the lamb and a little child shall lead them." And while I am decidedly of the opinion that the power to inflict corporal punishment should be retained in our schools, I am also of opinion that it and all other punishment should be sparingly used. Far sooner would I that one hundred guilty ones should go unpunished than that one innocent child should suffer.

The teacher who can govern without wicked frowns or the too frequent repetition of the rod, I declare to be the best teacher. I do not believe either that the little ones are sent to our schools to be made dummies of; that during the six hours out of twelve they should be housed up in the school-room as silent as death. I do not believe that the teacher should flourish his ferrule over their heads during these tedious hours each day; and if the inclination is not for study, compel them to keep moving their lips at least. Unfortunately I see such too often practised. Faithful teachers should endeavor to make, to these little ones, the school-house a house of pleasure instead of a house of pain. Whatever provocation the teacher may receive, he ought to maintain his temper, never to appear angry, and, if he should happen to get a little excited, he should not let the sun go down upon his wrath. Call not the children hard names, and do not discourage them. For the sake of the children and their future interests, dispense with fault-finding and scolding in the school room. Let not such words as dunce, blockhead, etc., etc., ever escape your lips, as the school room is not the place for such, and the teacher who uses such expressions is more deserving of corporal punishment than the worst pupil. Cause all the children, if you can, to go through their studies with cheerfulness, and if possible, at times to create amongst them a hearty laugh, as it is the best education medicine which they can receive, and then you will be surprised to see the hum of business in the school, as everything will be done willingly. Above all, show no favor or partiality, as the little ones are very sensitive to such, and there is nothing which harrows the feelings of a sensitive child or a sensitive parent as to think that the teacher punished him and permitted others equally culpable to escape. One such imprudent act may mar the harmony and establish in the mind of that child such a feeling of hostility against a teacher which even grey hairs cannot obliterate. It is well known that in times gone by the mode of inflicting corporal punishment in the schools was not such as to establish in the memories of the pupils a very great amount of veneration or affection for the gentleman who administered it.

And now, in conclusion, permit me to give my experience in the matter, and it is this: I always found that ninety per cent. of my pupils could at all times be governed by the laws of kindness and love, and with such I never found any necessity for corporal punishment, but I regret to say that the remaining per centage, or less, I found to be unruly, headstrong, quarrelsome little fellows, who by their conduct would continually keep the school in turmoil and the teacher in hot water, pupils who were frequently guilty of crime, and when brought to an account, would lie to exonerate themselves. With all such, I say, and say boldly, that I found three and a half feet of which the Irish Dominie called *lickum candy* to be worth about ten yards of moral suasion.

OBJECT LESSONS.

BY T. MARCHANT WILLIAMS, B.A., INSPECTOR TO THE LONDON SCHOOL BOARD.

A paper read before "The Education Society," London.

A French writer on Education, after expatiating eloquently on the uses of Object Teaching, very pertinently asks the question,—Why, if the Object Lesson be so useful, do not teachers avail themselves more frequently of it? He hazards an answer to the question, and it is,—that the Object Lesson, to be really useful, must be carefully prepared before its delivery, and this careful preparation necessarily involves a great deal of trouble, which to teachers is distasteful. There is some truth in this answer, no doubt; and, regarded as an answer to the question as having exclusive reference to French teachers, there may be in it more truth than an English teacher would feel disposed to admit, if applied to himself; but rely upon it, the whole of the truth is not enshrined in the answer, even though it be assumed that the question has reference solely to the teacher of a French elementary school. Unproductive or unremunerative trouble is distasteful, and ought to be distasteful, to all teachers; but, I take it that there are very few, if any, teachers who are so purblind as to suppose that time and care judiciously spent upon the preparation of lessons are wholly, or even partly, unfruitful. What teachers usually forget is, that the fruits of their labour are frequently slow in making their appearance; they lack the requisite patience to wait for the legitimate outcome of judicious effort to reveal itself; and Object Teaching is neglected therefore, partly, because it does not seem to yield quick returns.

But I have not yet stated all the reasons, nor indeed the chief reason, why teachers of public Elementary Schools in England so rarely take full advantage of Object Teaching. The omission is not entirely the fault of the teachers, but is mainly due to the system under which they work. It is not unusual, at gatherings of teachers such as this, for speakers to angle for approval and applause by making a fierce onslaught upon the Code and its ingenious originator. I would hope that I am above such a paltry rhetorical trick; and therefore, while readily admitting the genius and skill of the framer of the Code, the reasonableness of the general principle upon which it rests, the justness and fitness of many of the gentlemen whose business it is to interpret it, I must claim the privilege as an educationist to declare that, in its present form, it is by no means free from grave faults, one of the most important of which is its inflexibility. The teacher is too much fettered by it and its interpreters; he is allowed but scanty scope for independence of thought and action, but is kept in a narrow groove out of which he dare not escape save at the risk of hopelessly failing to produce the particular results which possess a value in the educational market. Who dares pay due attention to Object Teaching, when the results of such teaching will be studiously overlooked by those in whose keeping are not only the teacher's professional reputation, but even the means of his subsistence? How can the teacher of a public Elementary School exercise the watchful patience of a skilful educationist, when he is distinctly bidden by the powers that be "to get through, in a fixed interval of time, a fixed amount of work, in a fixed direction; and any work that he may feel tempted to do in any other direction, will be ignored or *pook-pooked* by the very men whose ignoring and *pook-pooking* mean clear loss to the teacher of money, and clear damage to his professional reputation.

But what is an Object Lesson, and what especial purpose is it

intended to serve? An Object Lesson, as it frequently if usually is, is a lesson on the general appearance, properties, and uses of an animal or thing, selected at random, and considered apart from, and independently of, other animals or things. As a general rule, the order in which the Object Lessons one hears at our schools follow one another, does not rest on a pre-arranged plan; the sequence of subjects has not been controlled by the laws of mental development. In short, there is an entire absence from such lessons of what may be termed scientific consecutiveness even the universally accepted educational principle, which demands a procedure from the Empirical to the Rational and not from the Rational to the Empirical, being violated in many if not in most cases. Be it clearly understood that I do not advocate the strict observance of an inflexible rigidity in the arrangement of subjects, or even an unalterable method of arranging the subject-matter of a lesson. No, some lesson might very properly begin the "uses" and end with "properties" or "appearances"; and the lesson on the dog might advantageously precede that on the cat, or a lesson on a thing might either follow or precede one on an animal. All I would insist upon is, that the easy should lead to the difficult, and that the teacher, in drawing up any particular lesson, or in arranging a course of Object Lessons, should ever keep in view the important fact that Object Teaching has a special purpose to serve, which purpose can be fully served only when the teaching proceeds strictly along the path which is heretofore in by the laws of mental growth and development. M. Buisson, one of the most enlightened inspectors of French primary schools, remarks that "the Object Teaching should pervade the work of the school, and should be the soul of all the teaching. It should pervade it," he continues, "as does the heaven the broad, that it may give life and heat and motion to the heavy cold mass of technical work which primary instruction can never dispense with." He further adds that he would not like the Object Lesson to begin and end at a fixed hour.

As an indirect criticism on the Object Lesson as it is given at the present day in English, French, and German elementary schools, M. Buisson's words are very appropriate, and merit retention; better have no Object Teaching at all than have what often passes under that name now, and which seems based on ill-arranged textbooks, and is chiefly intended, one would think, to cram the crude and disconnected facts compiled together in these books down the throats of our credulous little children, whose power to swallow such facts, be it remembered, is far greater than their power to digest and assimilate them. Buisson is right in advocating so eloquently the banishing from the schools of his country the idle talk about the opacity of coal, the transparency of glass, and the porosity of sponge, and the substituting for it an Object Teaching spirit which shall permeate and vivify and illumine the whole work of the school. His mistake, it would appear to me, is, to suppose that this in itself would be enough; or, in other words, to suppose that it is not possible to arrange for the delivery of a set of Object Lessons which shall be given at regular intervals and which shall prove of the highest educational value, and at the same time to have the study of the cold and ponderous technical subjects lightened and brightened by the Object-Teaching-spirit. In fact, this spirit is essential in all schools and in all the work of a school. If it be absent, the work becomes mechanical, monotonous, and irksome; the school becomes a stifling hot-house, instead of a child's garden, spreading itself under the open blue sky with heaven's sun shining upon it and heaven's breezes playing upon it.

Let me observe, by the way, that there are few recent writers on Method who have written exhaustively on this subject of Object Teaching, and still fewer who have written profoundly upon it. The chapter which is devoted to it in Prof. Bain's "Education as

a Science" is the best I know of on the subject. This book ought to be in the hands of every teacher, and this particular chapter should be read and re-read by all who are interested in the training of children. One of the chief defects of the book is the stiffness and aridity of its style, just as it is one of the chief merits of Mr. Fitch's able "Lectures on Teaching" that the style is so even and entertaining. Mr. Fitch has very little that is new to say on Object Lessons, unless you would consider that his observation, that "The lesson must have a beginning, a middle, and an end," savours of novelty. We all know that what Mr. Fitch really means, is that every lesson should be methodically arranged in the teacher's mind; although I must admit, that when I first stumbled upon the dogmatic statement, I felt strongly interested to know if it be possible to draw up a lesson that shall have no beginning, which therefore can have no middle, and which shall be endless. Wagner's criticism of Mendelssohn would be fairly applicable to Fitch, in so far as his treatment of the Object Lesson is concerned,—"He has very little to say, and he says it like a gentleman." Buisson's admirable paper on Object Teaching will be found in the volume of pedagogic lectures delivered at Paris in 1878 to the teachers who had come to see the Exhibition. The only other writer on the subject I would specially recommend to your notice, is Madame Pape Carpentier, the Inspectress of French Infants' Schools, whose books on School Management and Method are pregnant with admirable and helpful suggestions. She has written extensively and well on Object Lessons.

But all this is digressive; let me return to the consideration of the question, *What are the uses or purposes of Object Teaching?* The Object Lesson, according to most writers and teachers, is intended to teach or train children (1) to observe or see, (2) to group and compare what they see, and (3) to embody the result of their observation and comparison in words. To look is one thing, to see is another and a different thing; the former is easy and natural, the latter implies an active effort of the mind. One cannot see or observe without exercising the power of discrimination. Intellectual effort rests on discrimination; and, according to our psychologists, "the consciousness of difference is the beginning of every intellectual exercise." The child recognises and describes one object as a large table, because it is able to recognise and describe the resemblance and difference between it and another object which it speaks of as a small or smaller table; and the child knows the cat to be a different animal from the dog, because it has seen both, and, having seen the one and the other, it has discriminated between the one and the other. The greater the delicacy or perfection of this discriminating or seeing power, the greater the variety of our impressions and our resources for physical and mental enjoyment, and our opportunities and advantages for mental development. The Object Lesson, then, should be described as a lesson which aims at cultivating or strengthening this power of discrimination, which reveals itself in every child at a very early age, and which has been partly cultivated in the family circle long before the child is placed under the care of the teacher. Rather than say, therefore, that the Object Lesson is intended to serve as the means of teaching children to observe and compare, I would say, that it aims at giving them a training in the art of seeing, by giving them an opportunity of comparing objects and noticing their points of agreement and difference. It serves also to extend a child's vocabulary, and to awaken and cultivate the retentive powers of his mind. The child's sensations are wrapped up in words which are to recall the sensations to the child's mind when subsequently used for the ordinary purposes of life. The first Object Lesson was given by the first mother; but it is Pestalozzi that has the merited credit of having first propounded the Object Lesson as a means in the hands of the teacher of training children to see well and to speak well. Pestalozzi, in reality, merely developed the favourite idea of Rousseau, and this idea was suggested to the distinguished author of *Emile* and the *Social Contract* by his observation of the instinctive habits of mothers. Dr. Pell and Joseph Lancaster, in former days, used to contend for the great distinction which attaches itself to the discovery, or, if you like, the invention, of what is known to teachers as the Monitorial System. The real inventor of the system was neither Bell nor Lancaster, but was the mother who first put one of her children to mind the baby. We all know that Miriam, the sister of Aaron and Moses, was an unpaid monitor, and she lived and flourished even before either Bell or Lancaster; and further, it may be well to remember that Pestalozzi had adopted the system before its advantages had been realized by Bell at Madras, or by Lancaster in the Borough Road.

But the Object Lesson with Pestalozzi was more of a lesson on words than on the differences and agreements between animals or things; and this must not be attributed to a disposition on his part to attach more importance to words than to things, but rather to the circumstance that he attached little or no importance to words apart from the things. His was the earliest attempt to utilise a great but old idea for educational purposes, and had he been more familiar than he seems to have been with the psychology of the human mind, and a greater master of discipline, his Object Lessons would have been far better than they were. He divided Intuition into three elements or parts—Number, Form, and Language. His Object Lessons, therefore, were intended to supply children with answers to the three questions—How many objects are there? What are they like? What are their names? One of his old pupils, Reaumur, thus describes one of his Object Lessons:—

"The exercises in language were the best things we had with him, especially those which related to the paper-hangings on the school-room walls, and which were real exercises of Observation. We used to stand for hours together in front of these hangings, which were old and torn, engaged in examining the pattern, the holes and the rents in them, noting their number, form, position, and colour, and formulating the result of our observations in phrases of graduated length and difficulty. On these occasions he would ask us,—'Boys, what do you see?' (He never named the girls.)

'A hole in the paper, a rent in the paper.'

P. "Very good; repeat after me,—'I see a hole in the paper, I see a long hole in the paper, Behind the hole in the paper, I see the wall, &c.; I see figures in the paper, I see black figures in the paper, I see black and round figures in the paper.'

"Of less utility," continues Reaumur, "were those exercises in language which he took from natural history, and in which we had to repeat after him and at the same time to draw the animals mentioned. He would say,

'Amphibious animals,
Crawling amphibious animals,
Creeping amphibious animals,
Monkeys, long-tailed, short-tailed.'

We did not understand a word of all this, for not a word was explained; and the whole was uttered in such a sing-song tone, and so rapidly and indistinctly, that it would have been a wonder if any one had understood anything of it, or had learnt anything from it; besides, Pestalozzi shouted so very loudly, and so incessantly, that he could not hear us repeat after him, the less so as he never waited for us when he had read out a sentence, but went on without intermission and read off a whole page at once. What he thus read out was drawn up on a half-sheet of large-sized mill-board, and one repetition consisted, for the most part, in saying the last word or syllable of each phrase thus:—'Monkeys, monkeys,' or 'keys, keys': there was never any questioning or recapitulation."

This is a very graphic description of the Object Lesson as it was in the hands of its propounder,—a great teacher notwithstanding his many imperfections, a man who aimed at reaching the loftiest ideals, but of whom it is related that he was frequently found weeping like a child with his face buried in his hands, and reproaching himself bitterly for not knowing how to do better than he did.

For the sake of useful comparison, I will here attempt to give you a description of an Object Lesson which was given in my presence the other day, at a good Infants' School, by an assistant teacher of more than ordinary intellectual and personal gifts. The subject was Water; the audience consisted of the children forming the 1st and 2nd classes below the Standard. They filled a large gallery at one end of the room, and numbered 83—clearly too many for one teacher. On a small table before the class stood a tumbler half-full of water, and near it stood a small wire tripod, upon which rested a small spirit-lamp. The other appliances for the lesson were a blackboard on an easel, a duster, a box of lucifer matches, and a piece of chalk, one end of which was daintily wrapped up in a piece of paper. The first question asked the children was, "What is this I have in this glass?" "Water," was the immediate reply. "Yes," replied the teacher, at the same time turning her back to the class, and writing the word "Water" on the board, not forgetting to give a gorgeous flourish to the initial letter. Then, facing her class once more, she gravely informed it that she purposed giving a lesson that morning on Water. The second question put to the class was, "Where do we get Water from?" The answers to this question were many. "From the clouds,—from God,—from the sea,—from the rivers,—from the New River Company," &c.

All of these answers were skilfully utilised, and it was eventually made clear that Water comes from the clouds, is found in the sea and in rivers, and forces itself out of the earth sometimes in springs. The word *sea*, *river*, *cloud*, and *spring* were in due course written on the black-board, and were afterwards spelt simultaneously by the children.

The next step was to enquire into the chief properties of water, which were declared to be—(1) *Softness*,—a child being called up to to the tumbler, and thereby proving to them that the water yielded to the gentle pressure exercised upon it. (2) *Transparency*.—This was proved by dipping a pencil into the water, and also by placing it behind the tumbler: the pencil was declared to be visible by the children in each position, who were then bidden to say together, "Water is transparent." The teacher insisted strongly on the fact that water is said to be transparent because we can see through it. The words *soft* and *transparent* were written on the black-board. (3) The teacher endeavoured to show that Water could be converted into Steam, and that Steam was therefore Water, by pouring Water into the pan, lighting the lamp underneath it, and afterwards holding the tumbler, which had been emptied and dried, over the Steam. The sides of the glass were found, after a time, covered with visible moisture.

The third and last step was to discuss the uses of Water. It was said that Water was a sort of food, and was also used for washing and cleaning purposes. "Washing," "food," and "cleaning" were written on the board, and the lesson was then over.

You will have perceived that this was a typical Object Lesson, and, whatever may have been its faults, it is but fair to admit that it was a decided improvement on Pestalozzi's lessons on long-tailed monkeys and the long hole in the wall-paper. The main defect of the lesson was, that most of the time was spent in talking about what the children already knew. Every child in the class knew that it could thrust its finger into water, that clean water can be seen through, and is used for drinking and washing purposes; but they did not know that, because it can be seen through it is said to be transparent, nor was it necessary that they should know it, at that stage of their school career. The child's vocabulary is not really extended if it be taught words which it cannot use.

The great problem we have to solve seems to me to be this:—How can the Object Lesson be made to serve as a basis for a systematic course of instruction in Science? To put this question in another form. How can the Object Lessons given in Infants' Schools be so arranged, and so delivered, that they shall provide the children with a useful preliminary training in the art of observing the facts, which are again to be studied more extensively and thoroughly in the various stages of their course through the senior departments of the school?

One way of effecting this will be, for the teacher to study carefully the elements of one or more of the Sciences—say Botany or Chemistry or Electricity—not merely by reading the ordinary books on these subjects, but also by studying the things themselves about which these sciences relate, the laws and facts revealed in the books being tested by every possible experiment. Having done this, the teacher will select the most suitable objects for the lessons—the suitability of the objects being dependent upon their accessibility to the teacher and children, and their fitness to illustrate the most important elementary facts of science. You will please bear in mind that the main use of the Object Lesson is to train and develop the perceptive faculties of the child; to add to his stock of usable words, and to supply his memory with facts, are subsidiary purposes.

If this suggestion be acted upon, the teacher will not on that account be fettered in the least degree as to the choice of subjects or the order of the lessons. For example, the lesson on a stick of sealing wax may be immediately followed by a lesson on silk, and this again by a lesson on paper, or glass, or a cat, or on an egg. The principle of attraction may be illustrated by rubbing and warming a piece of sealing wax, the fur of a cat, a piece of india-rubber, or of brown paper. This principle might be taught, by experimenting on a variety of objects, in one lesson; or it may be taught incidentally, and together with other principles and facts, by experimenting on objects in a series of lessons.

My plan does not exclude the possibility of having an endless variety of lessons, of objects, and of methods. All it necessarily implies is—

- (1) A previous mastery by the teacher of the facts to be taught.
- (2) A careful selection of subjects and experiments.
- (3) Thorough preparation.

The plan involves trouble—trouble usually commands success.

Bain thus enumerates the ordinary defects of the Object Lessons of the present day:—

- (1) Needless or superfluous communication.
- (2) Obscurity of word and thought.
- (3) Bad arrangement.
- (4) Unreasonable digressions.

Think of these; and pray think, also, of the following suggestions with which I venture to close this paper:—

(1) Spend no time in telling children what they already know, or what they are likely soon to know by their own unaided efforts. All the time at your command will be needed for the explication of facts which the children are not likely soon to find out without your aid.

(2) Use the simplest words.

(3) Illustrate everything capable of illustration by experiment. Most wonderful and suggestive experiments can be made with very cheap and easily constructed apparatus.

(4) Be most careful to see that the experiments shall always come off, so to speak, without the least waste of time. This will demand the most careful preparation and the exercise of great forethought and skill and patience.

(5) Follow no rigid rule as to the divisions of the lesson.

(6) Be careful to utilize, as far as possible, both the good and the bad answers.

(7) Make judicious use of the black-board. The teacher should never lose the attention of any children in the class, though the black-board be frequently used for sketching and writing purposes.

One last word. All this cannot be achieved without great effort on the part of teachers, and a far greater measure of liberty in the choice of subjects and of methods than the teachers of Public Elementary Schools now enjoy.

DR. GLADSTONE spoke of the growing importance of Object Lessons in the eyes of Educationists both in France and England, and said that there was a strong movement now in favour of making the giving of Object Lessons a necessary condition for obtaining the grant in Elementary Schools.

MR. LANGLER did not entirely agree with Mr. Williams. He was certainly of opinion that it is more important *how* we teach than *what* we teach; but, on this very principle, he protested against Mr. Williams' claim, that a teacher, to give satisfactory Object Lessons, should be well acquainted with one or two sciences. Of course, the better informed a teacher is, the better he teaches; but it is not necessary that the Object Lessons should consist in consecutive lessons in Botany, Electricity, or any one science. Every lesson on any subject whatever, if it goes upon the lines indicated by Mr. Williams, may be in itself complete, and give that training in observation and inference which is more important than knowledge of any particular facts. The custom of writing up the names of the qualities of the object on the board, is simply folly. The most important effects of Object Lessons are the mental discipline, extension of the vocabulary, and the culture that comes through contact with a superior mind.

FRAULEIN HEERWART said, if Pestalozzi has paved the way for the introduction of Object Lessons, he has done good service in showing the importance of bringing the child into contact with objects and letting it observe. In the Kindergarten, the object is always put in the child's hands—without that, an Object Lesson is useless. It is always a pity if children are not, from the first, in the habit of being introduced to nature, by taking them to it, or taking it to them.

DR. GLADSTONE.—It is astonishing that more attention has not been given to this subject; for the child has been having Object Lessons informally long before school-days from its mother and friends, and then in the school the whole of this has been thrown aside and words only been taught. A vicious system is not altogether eradicated when the evil of it has been seen and it has been apparently thrown aside, and so merely verbal teaching has permeated the Object Lessons themselves. Naming things and qualities is not really the Object Lesson—that is, seeing, feeling, and testing the object. The very essence of the idea of an Object Lesson is, that the various properties of objects, and their difference from the surrounding objects, should be learned from sense-perceptions. Mr. Williams has rightly insisted that the Object Lessons shall form a connected whole; but that object should be attained, not by teaching one or two special sciences, but rather by a root-science, out of which the special sciences afterwards differentiate themselves. A great deal more might be done than is generally done, in the way of description and drawing, and the children should do both.

General Information.

GIANTS.—We of the present day are mere "Tom Thumbs" when compared with the huge individualities of antiquity. The Giant Galbará, brought from Arabia to Rome, under Claudius Cæsar, was nearly ten feet. Funman, who lived in the time of Eugene II, measured eleven feet and a half. The Chevalier Scrog, in his voyage to the Peak of Teneriffe, found in one of the caverns of that mountain the skull of a Guanco, which had eighty teeth, and it was supposed that his body was not less than fifteen feet long. The Giant Ferragus, slain by Arlando, nephew to Charlemagne, was eighteen feet high. In 1614, near St. Germain, was found the tomb of the Giant Isoret, who was twenty feet high. In 1590, near Rouen, they found a skeleton whose skull held a bushel of corn, and whose body must have been eighteen feet long. Platerus saw at Lucerne the human bones of a subject nineteen feet long. The Giant Buotrat was twenty-two and a half feet high; his bones were found in 1705 near the banks of the river Moneri. In 1613, near a castle in Dauphin, a tomb was found thirty feet long, twelve wide, and eight high, on which were cut the words, "Keutolochus Rex." The skeleton was found entire, twenty-five feet and a half long, ten feet across the shoulders, and five feet from the breast-bone to the back. Near Mazarino, in Sicily, in 1516, was found the skeleton of a giant thirty feet high. His head was the size of a hog's head, and each of his teeth weighed five ounces. Near Palermo, in Sicily, in 1548, was found the skeleton of a giant thirty feet long, and another thirty-three feet high, in 1550.

BANDS of music are forbidden to play on most of the large bridges of the world. A constant succession of sound-waves, especially such as come from the playing of a band, will excite the wires to vibration. At first the vibrations are very slight, but they will increase as the sound-waves continue to come. The principal reasons why bands are not allowed to play while crossing certain bridges—the suspension bridge at Niagara Falls, for instance—is, that persons following the bands, as a general thing, will keep step with the music, and this regular step causes the wires to vibrate. On suspension bridges military companies are not allowed to march across in regular step, but they are compelled to break their ranks.

THE BIBLE may be divided as follows:—

	Old.	New.	Total.
Books	39	27	66
Chapters	929	260	1,189
Verses	23,214	7,959	39,173
Words	522,434	181,253	773,692
Letters	2,728,100	838,380	3,566,480

HISTORY OF GLASS.—In the year A.D. 676 "messengers were sent out," according to Bede, from Wearmouth, England, to Gaul, France, to fetch makers of glass (artificers?), "who were at this time unknown in England, that they might glaze the windows of the church, with the cloisters and dining-rooms." Bede adds that "they taught the English nation their handicraft, which was well adapted for inclosing the lanterns of the church, and for the vessels required for various uses." About this time Archbishop Wilfred, of York, "filled with glass" the windows of the cathedral, previously "open to the weather," and "such glass," says one, "as permitted the sun to shine through;" from which it may be inferred that glass was made that was impenetrable to the sun's rays. It was recorded, in connection with this cathedral, that "great astonishment was excited, and superstitious agency suspected, when the moon and stars were seen through a material which excluded the inclemency of the weather." Still, the adoption of glass was slow, for in 1214 Robert de Lindeley, Abbott of Peterborough, employed glass "in beautifying thirty of the windows of his monastery, previously stuffed with straw to keep out the wind and rain;" and for some generations later the domestic windows of England were not furnished with glass, but lattice. When glass windows were first introduced they were not fixtures, but were regarded as movable chattels, and were so considered until A.D. 1600.

MUCH interest is now being taken by scientists in regard to the habits, instincts and emotions of fishes. Naturalists have generally accepted Cuvier's view—that the existence of fishes is a silent emotionless, and joyless one; but recent observations tend to show that many fishes emit vocal sounds, and that they are susceptible of special

emotions, particularly such as regard for their young, attachment between the sexes, and for locality. Among monogamous fishes there is often seen decided evidence of watchfulness over their young, in which the males not unfrequently act an important part. Among nest-building fishes the male often prepares the nests. Among some who do not build nests the eggs are carried about in the cheek-hollows of the male. Cases have been noticed where male fishes have remained in the same spot in the river from which the female had been taken. A case is noted where, after a pair had been separated, both appeared miserable and seemed nigh unto death; but on being united again both became happy. In fish-battles it is sometimes noticed that the conqueror assumes brilliant hues, while the defeated one sneaks off with faded colors, the change evidently being brought about by emotional feelings. Some fish organize for common defence, or to attack a common enemy.

Examination Questions.

PUPIL TEACHERS' EXAMINATION PAPERS.

THREE HOURS AND A HALF ALLOWED.

ARITHMETIC.

MALES.

- If a pole 10 feet high cast a shadow 12 feet 8 inches long, how high is a tower which casts at the same time a shadow 57 feet high?
- Compare the cost of 150 oranges at 9½d. a dozen, and that of 3½ lbs. of tea at 2s. 10½d. a lb.
- Find the total cost of the following:—
3019 articles at 18s.
517 articles at £1 18s.
2466 articles at 16s. a dozen.
620 dozen at £2 4s. per score.
- How many yards worth 3s. 7½d. should be given in exchange for 935½ yards worth 18s. 1½d. per yard?
- 518 ac. 3 rd. 7¼ poles at £118 7s. 6d. per acre.

FEMALES.

- Make out the following bill:—
81 yds. silk at 3s. 9d. per yd.
225 yds. flannel at 1s. 7d. per yd.
108 yds. serge at 1s. 8d. per yd.
45 umbrellas at 11s. 6d. each.
51 prs. of silk stockings at 10s. 7d. per pr.
360 prs. of gloves at 1s. 2½d. per pr.
- Find the cost of 7551 articles at £3 15s. 2½d. each.
- 37 cwt. 2 qrs. 13 lbs. at £4 14s. 6d. per cwt.
- What is the value of 10,060 articles at one shilling and elevenpence halfpenny each?

GRAMMAR.

- Parse all the nouns, verbs, and adjectives in the following:—
"It ceased, the melancholy sound,
And silence sunk on all around;
The air was sad, but sadder still
It fell on Marmion's ear,
It plained as if disgrace and ill,
And shameful death, were near."—Scott.
Point out and parse all the adjectives and adverbs in the above.
- Give two examples of verbs in the imperative, and two of verbs in the subjunctive mood.
- What adjectives are compared by adding *er* and *est* to the positive?

GEOGRAPHY.

ANSWER TWO QUESTIONS.

- Name in order the river-mouths, bays, headlands, and principal seaports between the Firth of Forth and the mouth of the Thames. Describe briefly the character of each seaport.
- What differences of climate are there between the east and the west sides of Great Britain? Give reasons for those differences.
- Say what you know about the physical features and industrial pursuits of Devonshire, Cumberland, and Aberdeenshire.
If you can, draw a map to illustrate one answer, and insert the lines of latitude and longitude.

PUPIL TEACHERS AT END OF FIRST YEAR.

THREE HOURS AND A HALF ALLOWED.

ARITHMETIC.

MALES.

1. Reduce, add together, and state total of the following five quantities:—£9 $\frac{3}{4}$, £16 $\frac{1}{2}$, £21 $\frac{1}{4}$, £5 $\frac{7}{8}$, £14 $\frac{1}{2}$.
2. What is the cost of 5 $\frac{1}{2}$ oz. of gold when 1 $\frac{1}{2}$ oz. are worth £6 $\frac{1}{2}$?
3. Reduce $\frac{3}{4}$ of a guinea to the decimal of £.
4. By what decimal is $\frac{3}{8}$ greater, or less, than the product of $\cdot 00756122 \times 77482$?
5. Divide the sum of £4 5s. 8. between two people, so that one may have three times as much as the other.

FEMALES.

1. If a gentleman's income be £500 a year, and he spends 19s. 4d. a day, how much will he have saved at the year's end?
2. If I pay 10 shillings for the carriage of 2 tons for 6 miles, what must I pay for the carriage of 12 tons 17 cwt. for 17 miles?
3. A gentleman bought a wedge of gold, which weighed 14 lbs. 3 ozs. 8 dwt., for the sum of £514 4s.; at what rate did he pay for it per ounce?
4. How many allowances of 5 oz. 7 drs. each may be cut from seven cheeses, each weighing 1 cwt. 2 qrs. 5 lbs.?

GRAMMAR.

1. Parse each word in the following—
 - (a) Yours faithfully.
 - (b) Sweet lord, you play me false.
 - (c) Far from the madding crowd's ignoble strife.
2. What is meant by interrogative adverbs? Give examples.
3. The suffix *ly* forms certain words into adverbs, others into adjectives: give examples.

GEOGRAPHY.

1. Draw a full map of France. Insert the lines of latitude and longitude.
2. Trace minutely the course of the Rhine, mentioning in order its tributaries and the towns on its banks, and describing the character of the country through which it flows.

HISTORY.

1. Write down a list of our sovereigns from Alfred to Edgar, with dates.
2. What sovereigns reigned between Henry I. and Richard II.? Give their dates.
3. Mention the names and dates of sovereigns who sat on the throne between 1660 and 1760.

PUPIL TEACHERS AT END OF SECOND YEAR.

THREE HOURS AND A HALF ALLOWED.

ARITHMETIC.

MALES.

1. Sixty-nine rifle competitors fired 30 shots apiece, and each man made an average of 1 $\frac{1}{2}$ centres. What was the percentage of centres to shots?
2. Find the interest on £527 11s. 9d. for 7 $\frac{1}{2}$ years at 3 $\frac{1}{2}$ per cent. per annum.
3. By selling eggs at 3 a penny I gain 5 per cent. What do I gain or lose per cent. by selling them at the rate of 25 for 6d.?
4. Divide £723 15s. among A, B, C, D, so that A, B, and C shall receive equal shares, and D $\frac{1}{4}$ of one of their shares.
5. Bought 236 yds. of lace at 7s. 10 $\frac{1}{2}$ d. per yd.; sold $\frac{1}{4}$ of it at 10s. 6d. per yd., $\frac{1}{4}$ at 8s. 6d. per yd., and the remainder at 7s. per yd. What was the gain or loss per cent. on the whole outlay?

FEMALES.

1. Divide 9 $\frac{1}{2}$ by $\frac{1}{2}$ of 7; and 5205 $\frac{1}{2}$ by $\frac{1}{2}$ of 91.
2. If 25 $\frac{3}{4}$ s. will pay for the carriage of 1 cwt. for 145 $\frac{1}{2}$ miles, how far may 6 $\frac{1}{2}$ cwt. be carried for the same money?
3. If £56 in 5 months gain £2 $\frac{1}{4}$, what time will £13 $\frac{1}{2}$ require to gain £1 $\frac{1}{4}$?
4. Reduce 9 oz. 2 $\frac{1}{2}$ drs. to the fraction of a pound avoirdupois.

GRAMMAR.

1. Point out and parse all the pronouns and propositions in the following:—

And never yet, since high in Paradise
O'er the four rivers the first roses blow,
Came purer pleasure into mortal kind
Than lived thro' her who in that perilous hour
Put hand to hand beneath her husband's heart
And felt him hers again.

- (a) What are the analogous forms to 'hers,' derived from *thou*, *you*, *they*? and how does the use of these forms (hers, etc., etc.) differ from that of *her*, *thy*, *your*, *their*?

- (b) Point out the principal sentence in the above, and analyse it.
2. Explain the terms—Syntax, subject, predicate, complex sentence, subordinate sentence.

GEOGRAPHY.

1. Draw a full map of our possessions in South Africa. Insert the lines of latitude and longitude, and explain how they are useful in drawing a map.
2. Give notes of a lesson on "The Productions and Trade of Hindostan."

SECOND PAPER.

ONE HOUR ALLOWED FOR FEMALES, TWO HOURS AND A HALF ALLOWED FOR MALES.

HISTORY.

1. How came there to be Roman legions in Britain? When and why did they leave it?
2. What was Danegeld? Tell its object and effect.
3. In what way did Edward III. and Henry IV. respectively obtain the throne?

EUCLID.

(All generally understood abbreviations for words may be used.)

1. The angles at the base of an isosceles triangle are equal to each other, and if the equal sides be produced, the angles on the other side of the base shall be equal.
2. To bisect a given finite straight line—that is, to divide it into two equal parts.
3. Describe a circle which shall pass through two given points, and have its centre in a given straight line. Is this always possible?

PUPIL TEACHERS AT END OF THIRD AND FOURTH YEAR.

THREE HOURS AND A HALF ALLOWED.

ARITHMETIC.

MALES.

1. A boy earns 18s. a week, spends only 14s. 6d., gives his mother $\frac{1}{3}$ of his savings to put by for him, and the remainder for her own use. What percentage of his income does he put by; and what percentage goes to his mother for her own use?
2. If £33 6s. 8d. produce £5 6s. 6 $\frac{1}{2}$ d. in 1 $\frac{1}{2}$ year, what sum may be expected from £520 17s. 11d. dealt with in the same way for 2 $\frac{1}{2}$ years, and what is the rate per cent. per annum of profit?
3. I bought 15 gallons of a liqueur for £27, and retailed it at 5s. a pint; what was the gain per cent., and what on the whole?
4. What income will be derived from shares paying 7 per cent. purchased (at par) with the sum accruing from the sale of £629 14s. 5d. of stock at 92 $\frac{1}{2}$ per cent.?
5. A has 50 chests of tea, which cost £22 10s. per chest; he barter with B, at an estimated profit of 20 per cent., for a quantity of mahogany at £30 a ton. The mahogany depreciating in value during storage, A loses on it 1s. 6d. per cwt. What is his net gain by the transaction?

FEMALES.

1. If $\cdot 375$ of a ship be worth £3740; what is the worth of the whole?
2. From 270.2 take 76.4075. and divide 721.17562 by 2.257432.
3. Reduce 2 gal. 1 qt. beer to the dec. of a barrel, and find the value of $\cdot 046875$ of a lb. avoirdupois.
4. Divide 3.5 by $\cdot 24$, and multiply 4.72 by 3.6.

GRAMMAR.

1. "It is great sin to swear unto a sin,
But greater sin to keep a sinful oath.
Who can be bound by any solemn vow

To do a murderous deed, to rob a man,
To reave the orphan of his patrimony,
And have no other reason for this wrong
But that he was bound by a solemn oath ?

—King Henry VI.

(a) Parse all the words in the last line.

(b) Analyse the two sentences contained in the last two lines, supplying any words that are required to make the analysis complete.

N.B. Take care to point out the character of each sentence.

(c) When is the infinitive mood used without being preceded by the word *to*? Give examples of this from the above passage, and mention others that occur to you.

2. Write the subject-matter of a lesson on either of the following:—Mood, Tense.

3. Give the Latin prepositions that mean under, with, across, out of.

GEOGRAPHY.

1. Draw a full map of our possessions in South Africa. Insert the lines of latitude and longitude, and explain how they are useful in drawing a map.

2. Give notes of a lesson on "The Caspian Sea."

SECOND PAPER.

ONE HOUR ALLOWED FOR FEMALES, TWO HOURS AND A-HALF FOR MALES.

HISTORY.

1. Give the names and dates of sovereigns of the House of Tudor, and show the relationship between them.

2. Do you consider our Stuart sovereigns to have been fortunate or unfortunate? Give your reasons.

3. During the reign of George III. a large foreign possession was lost to England. Explain the event and give some particulars.

EUCLID.

(All generally understood abbreviations for words may be used.)

1. If two triangles have two sides of the one equal to two sides of the other, each to each, but the base of one greater than the base of the other; the angle contained by the sides of the one which has the greater base shall be greater than the angle contained by the sides, equal to them, of the other.

2. The opposite sides and angles of a parallelogram are equal to one another and the diameter bisects it, that is, divides it into two equal parts.

3. If in the sides of a square, at equal distances from the four angles, four points be taken, one in each side, the figure formed by joining them will also form a square.

ALGEBRA.

1. Explain the terms *coefficient*, *expression*, *factor*, *index*, *greatest common measure*, *identical equation*.

Find the coefficient of x^3 in the product of $ax^4 - bx^3 + cx - d$ and $px^2 - qx + r$.

2. Reduce $\frac{x^2 - 5x + 6}{x^2 + 2x - 8}$ and $\frac{6 + x - x^2}{8 + 6x + x^2}$ to lowest terms, and then add them together.

3. Solve the equations:—

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

$$(2) \frac{7x + 1}{x - 1} = 3\frac{1}{2}(\frac{x + 4}{x + 2}) + \frac{1}{3}.$$

PUPIL TEACHERS AT END OF FOURTH AND FIFTH YEAR.

THREE HOURS AND A HALF ALLOWED.

ARITHMETIC.

MALES.

1. Sold goods for £225 10s. 0d. with a gain of $12\frac{1}{2}$ per cent., how much per cent. would have been gained or lost by selling them for £187 10s. 0d.?

2. What sum must I have invested (neglecting fractions of a penny) in $3\frac{1}{2}$ per cent. stock at $89\frac{1}{2}$, in order that, spending daily 15s. 6d. out of my income, I may lay by in a year (365 days) £123.55?

3. If the loss per cent. in selling 50 copies of a book at 7s. 6d. per copy, 80 at 4s., and the remainder of the edition for £12, was $35\frac{1}{2}$; what was the cost of publishing the book?

4. By how much greater or less than £25 5s. 6d. will be the in-

terest on £321.76875 for 2 years 5 months at $3\frac{1}{2}$ per cent. per annum?

5. What is the length of the four equal sides of a rectangular park containing 98759.3476 square yards; or, what fraction of a mile is the side of a similarly shaped park containing 694 square mile?

FEMALES.

1. If I buy a yard of cloth for 14s. 6d. and sell it for 16s. 9d., what do I gain per cent?

2. At what rate per cent. will £956 amount to £1314 10s. in $7\frac{1}{2}$ years at simple interest?

3. A young man received £210, which was $\frac{2}{3}$ of his elder brother's portion; now three times the elder brother's portion was half of the father's estate, how much was the estate worth?

4. Find the interest of £985 2s. 7d. for 5 years 127 days, at $5\frac{1}{2}$ per cent. per annum.

GRAMMAR.

1. "Let it be remembered, that to write, however ably, merely to convince those who are already convinced, displays but the courage of a boaster."—COLERIDGE. *The Friend*.

(a) Analyse the above passage.

(b) Parse fully all the words in italics.

(c) What is meant by a finite verb, and what is the nature of the infinitive mood? Illustrate from the above passage.

2. In what respects is the English alphabet incomplete?

GEOGRAPHY.

1. Give notes of a lesson to an advanced class on "The Lines of Latitude and Longitude, as shown on a globe, their meaning and their usefulness.

Draw a map of North America, with the lines inserted, and refer to this map at each point of the lesson.

2. What is a Coral Island? Where are such islands found?

SECOND PAPER.

ONE HOUR ALLOWED FOR FEMALES, TWO HOURS AND A HALF ALLOWED FOR MALES.

HISTORY.

1. What English sovereigns have died a violent death? Distinguish between accident and design, and give dates of the events.

2. When and how did the conquest of Ireland begin, and under what circumstances was the legislative union with that country effected?

3. Mention what you consider to be the most important events which have happened so far in the reign of the Queen.

EUCLID.

(All generally understood abbreviations for words may be used.)

1. ABCD is a parallelogram; through A draw any line, and show that the distance of C from this line is equal to the sum or difference of the distance of D and B, according as the line passes without or within the parallelogram.

2. If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts, together with twice the rectangle contained by the parts.

3. To describe a square that shall be equal to a given rectilineal figure.

ALGEBRA.

1. Show that $3(y - x)(y + x)(5y^2 - 8xy) + 5x^2 = (x - 2y)^4 - (2x - y)^4$.

2. Find a number such that, whether it be divided into two or into three equal parts, the continued products of the parts shall be the same.

3. Solve the equations:—

$$(1) \begin{cases} 10x - 11y + 12 = 0. \\ 13x - 14y + 11 = 0. \end{cases}$$

$$(2) \frac{7x}{3} + \frac{3-x}{2} = 20\frac{1}{3}.$$

MENSURATION.

1. "The area of a triangle is half the product of the base and the altitude." How would you prove this to a class of boys who have read the first book of Euclid?

2. An oblong grass plot 120 feet by 60 is to be levelled at £6 1s. per square chain, and a lawn tennis court 78 feet by 36 is to be turfed within it at 4d. per square yard. What will be the cost?

Practical Department.

LESSONS ON CHEMISTRY.

(Continued from last month.)

9. But in a true chemical compound the union is far more intimate, than in a mere mixture, and the most powerful microscope fails to reveal to the eye the ultimate molecules of the compound, still less the atoms of its elements. The minute constituents are held together by a force far greater than the attraction of a magnet. The moment the chemical force comes into play, the subdivision of the ingredients is carried on to a wonderful degree of fineness, far beyond the ken of the eye aided by the most perfect optical instrument. Sir William Thompson states that in any ordinary liquid or transparent or seemingly opaque solid, the mean distance between the centres of contiguous molecules is less than one hundred-millionth of a centimetre. (N. B. centimetre = .394 inch.) These small atoms and molecules are combined in greater or less groups and held together by a most extraordinary force.

10. Thus a *Chemical Compound* may be known by the union of its materials in definite proportions by weight, these proportions being called the atomic or combining weights when reduced to their lowest terms and compound with the weight of hydrogen taken as unity. A total change of properties, as density, color, solubility, crystalline form, chemical action on other bodies etc, also occurs and indicates chemical union. The evolution or the absorption of heat are frequent concomitants.

11. The results of chemical union or separation will generally be visible, yet we cannot depend on our senses alone to furnish evidence that the chemical force has been brought into play. We can only rely with certainty upon analysis of the compound. The chemical reactions and the definite composition are the only real tests. All other conditions may be accidental or may be absent. Thus in photography, a dried film of pure iodide of silver spread on glass may be exposed to light and still remain to all appearance unaltered for a length of time. We cannot distinguish by mere observation independently of experiment between the exposed and the unexposed surface. But as soon as the exposed film is washed with a dilute solution of pyro-gallic acid, or of sulphate of iron, the silver is reduced and blackened only at those places where the light has produced chemical change, and the amount of blackening will be precisely proportioned to the intensity of the luminous impression.

12. *Chemistry* prys into the individual molecules of which a body is made up; enquires how many atoms the molecule possesses, and of what kind they are; notes changes in the relation of these atoms to each other in the molecule; and observes the changes which result in the breaking up of the original molecules, and the formation of fresh ones by the re-arrangement of their atoms. In thus investigating terrestrial matter it is found that all the various forms of matter that have been examined can be divided into two great classes—

1. **Elementary Bodies**, elements, or simple substances out of which the chemist has not been able to get two or more essentially different substances. The number of these elements at present admitted is about sixty-five. By calling them elements we only mean that chemists have hitherto been able to get only one kind of matter out of them. It is quite possible that some of them may turn out to be compounds, and that other new elements may be discovered. The spectrum analysis of light shows that many of these elements exist in the sun and in the fixed stars. The analysis of meteoric stones has failed to discover any new element not found on the earth.

II. **Compound Bodies** which contain two or more kinds of matter. Thus chalk can be made to yield these elements namely

an invisible gas, oxygen—a black solid, carbon,—and a white shining metal, calcium. Sugar may be resolved into oxygen, and hydrogen gases, and solid carbon. Iron rust consists of iron united with oxygen gas.

13. The greater number of elements have been found in minute quantities and may be regarded as unimportant. The elements have been divided for convenience into two classes **Non-Metals** and **Metals**. The division is a purely arbitrary one as it is not possible to draw an exact line of demarcation between these two groups. To the first class belong elements which are gaseous at the ordinary temperature—oxygen, hydrogen, nitrogen, chlorine, and fluorine—together with certain solid bodies—carbon, sulphur, phosphorus, iodine etc. Metals are such substances as gold, iron, silver and mercury. They are all solid, except mercury, at the ordinary temperature. Most of them are opaque, have the metallic luster, generally a high specific gravity, and conduct heat and electric. v readily. But there are exceptions in both classes and it is merely a division for convenience. It is customary to use the first letter or letters as a contraction for the name of any element, and this is its *Chemical Symbol*, and chemical combination is expressed by uniting the symbols side by side.

NON-METALS.

NAME.	SYMBOL.	ATOMIC WEIGHT.		ATOMICITY.
Hydrogen.....	H.	1		} Monads.
Chlorine.....	Cl.	35.5	35.37	
Bromine.....	Br.	80	79.75	
Iodine.....	I.	127	126.53	
Fluorine.....	F.	19		
Oxygen.....	O.	16	15.96	Dyad.
Sulphur.....	S.	32	31.98	" or Tetrad, or Hexad.
Selenium.....	Se.	78		"
Tellurium.....	Te.	128		"
Nitrogen.....	N.	14	14.01	Triad, or Pentad.
Phosphorous.....	P.	31	30.96	"
Arsenic.....	As.	75	74.9	"
Boron.....	B.	11		"
Carbon.....	C.	12	11.97	Tetrad.
Silicon.....	Si.	28		"

The first column contains the atomic weights that have been in use, and which will be used in all calculations in this book. The second gives the correct equivalents according to the latest researches.

METALS.

(ONLY THE MORE IMPORTANT.)

NAME.	SYMBOL.	ATOMIC WEIGHT.	
Potassium.....	K.	39	I
Sodium.....	Na.	23	I
Silver.....	Ag.	108	I
Barium.....	Ba.	137	II
Calcium.....	Ca.	40	II
Magnesium.....	Mg.	24	II
Zinc.....	Zn.	65	II
Mercury.....	Hg.	200	II
Copper.....	Cu.	63	II
Manganese.....	Mn.	55	VI&c
Iron.....	Fe.	56	VI&c
Aluminium.....	Al.	27.5	IV
Lead.....	Pb.	207	IV

EXPERIMENTS.

1. Put some lumps of ice in a flask with a long bent tube fitted into the cork. Wrap some cloth or blotting paper round the tube and keep it moist by dropping water upon it. Place the end of the tube in an empty flask, partially submerged in cold water. If the spirit lamp be now placed beneath the ice, it will be changed partly

mercy to the children he had been inclined some time ago to ask that they be allowed to stop.

Prof. J. V. Montgomery said he had seen this plan in operation in other Pittsburgh schools, where all the pupils did just as good work as we have seen, and with no indications of being unduly excited or tired.

Mr. Luckey—I don't think these children look particularly nervous, or very tired; but as they have had a long ride here, and an early breakfast, we will dismiss them now, unless somebody is not satisfied they can do what we say.

The children were dismissed amid hearty applause.

Dr. A. B. Miller said he was sorry so much time had been spent in repetition which could only prove what every observant person knew after the first ten minutes—that it was fair and honest work. This lightning drill was a grand success in itself, but he would like to know what was the effect of this intense activity upon the brain. Is not the unnatural excitement likely to prove hurtful?

Prof. Luckey—We have seen no injurious results whatever. The children like it, they do not get tired, and it keeps them wide awake, and does them good. Any of you can try it for yourselves, and see if it does any harm: we think not.

The discussion closed here, and we think at this point it is desirable to give Prof. Dolan's exposition of the plan, furnished by him to the Pittsburgh papers:

"The formal study of arithmetic should not be introduced till the child has gained a knowledge of number in the abstract from his every-day experience. This knowledge comes at about the age of eight years; and if a child commences arithmetic before such knowledge is secured, he combines figures instead of combining numbers, and thus he is wrong from the beginning. The combining of numbers develops the brain, and is a good mental drill. The combining of figures, if it develops the brain at all, is of little or no use as a mental exercise.

"As the fundamental rules—addition, subtraction, multiplication, and division—require but little reasoning power, they should be mastered before the power of reason develops, so that when the reasoning power does come, the child may be prepared to use it. This power comes so as to be profitably used in arithmetic, at about the age of ten years.

"To secure the best results in mastering the fundamental rules, a number of principles, running throughout the entire work, must be observed. The first of these relates to the element of time. The flow of nerve energy requires time; thought requires time. If this time is not allowed, the pupil will blunder; he cannot assimilate, and there will be little or no intellectual development. On the other hand, if too much time is allowed, the mind will wander. Time must be allowed for recuperation. Thought consumes the highest type of nerve force, and if the demand exceeds supply, thought stops. This alternation between supply and demand occurs between the naming of results in the fundamental rules of arithmetic. This brings in the element of vibration—of action and repose—which permeates the entire universe. The observance of this law of vibration, of sympathy, is a powerful auxiliary in concert teaching. In oral work, results should be given at regular intervals of time. In addition, one of these intervals should be allowed at the end of each column for writing the result. That the circle of nerve action may be complete, the result should not rest in the brain, but should be expressed orally or in writing. But, since writing results is much more difficult, as well as much more practical, the teacher should insist upon pupils writing results whenever practical.

"Both oral and silent work should be required. A child may be able to perform arithmetical operations, giving results orally, which

he could not perform silently. When results are given orally, the motor energy required to express the results reacts upon the ideational tract, and assists ideation.

"Our pupils count in the second year of their course. They commence addition at the beginning of the third year. They add 2's; then 1's and 2's; then 3's; then 1's, 2's and 3's, and so on—completing the addition in two years. We teach addition, multiplication, short division, subtraction and long division in two years, and in the order here named. We have these rules overlap, so that we complete them all in the above time. Although addition is commenced seventeen months before long division, they are both completed at the same time.

"Our time to add twelve numbers of ten figures each, is one minute. This is the greatest rapidity that we permit in oral addition. In silent addition some of our pupils add three terms per second, and some even four; but they are all required to add two terms per second.

"In multiplication, we use the table in the margin. We have no recitations on the multiplication table; pupils learn the table by applying it to their actual school work. Our time, when the multiplier is greater than one and less than ten, is one second for each product figure. We multiply 1's and 2's by 3's as soon as we can add 2's; 1's, 2's and 3's by 3's, as soon as we can add 3's and so on, keeping the multiplication close to the addition all the way through. In short division, we use the same table as that used in multiplication. We commence with two as a divisor, then three, then four, and so on through the digits. Our time, when the divisor is more than one and less than ten, is one second for each quotient figure—though some of our pupils find two quotient figures per second. In subtraction, our regular time is one difference figure per second; still some of our pupils find two per second."

It may be added that essentially this method is fully presented in Beebe's *First Steps Among Figures*.

HINTS TO TEACHERS.

BY S. P. ROBINS, LL.D., SUPT. OF PROTESTANT SCHOOLS, MONTREAL.

GENERAL.

1. Remember that, inasmuch as you are left very much to the guidance of your own judgment in the management of your class, it is especially necessary to use all your observant and inventive faculties for securing the best possible result of your labor.
2. That best possible result is the thorough preparation of each of your own pupils to prosecute his studies and perform all other duties well hereafter. The first aim is not a high standard of attainment, but a good discipline of mind and manner, so far as it can be attained with each little pupil.
3. Because the habits of thought and action that are earliest formed are the most persistent and influential throughout life, and because the imitative faculties of a little child are especially active and his nature peculiarly impressionable, yours is the most important work done in school. It is difficult work, but if well done, you deserve corresponding consideration and honor. If you do not get them now, yet, your heart and life being right in other respects, you will secure them hereafter.
4. As you are conducting, in common with other painstaking

and successful teachers, a great experiment in the management of half-day classes with very little children, carefully observe whatever in your manner, or in the ingenious devices to which you will be led, makes for your success, practice it diligently, and tell of it to others.

DISCIPLINE.

There is no need of reference here to the mode in which the successful teacher acquires ascendancy over each of her pupils by strength and consistency of character, by a loving heart, a kind manner, and a clear and vigorous understanding. All these things are pre-supposed in the successful teacher. When, as in my presence less than twelve months ago, a teacher says to a class, "I will look at the slate of no child out of place," and then in less than a minute does so, it is not surprising that her class despise her authority, and make little or no progress. One who can promise so lightly, and forget so readily, is fit for no important trust; certainly, not for that of the teacher. But there are many things, little in themselves though important in their results in discipline, which are sometimes overlooked even by those who have all the essential elements of excellent teachers.

1 Consider well the disposition of a little child. He is active, but undisciplined. He longs to know, takes great delight in learning; he loves to do, takes great delight in putting his knowledge into practice. But then he has but little persistency and steadiness.

2. You must, therefore, when he is not at play, teach him constantly or keep him doing constantly, and this with rapid alternations from the employment of his mind to the employment of his body.

3. So you must never be without a definite plan of action that shall engage the attention of every child. A half-minute's embarrassment of the teacher in the presence of the class, will work ruin in its discipline for the time being, and a child with nothing definite to do at any time during the school session becomes forthwith a centre of disturbance.

4. You must not put too prolonged a strain on the feeble power of attention in pupils of preparatory grade. Let your work be varied, and your lessons short and lively. Let the teachers who will follow you in the school course have most of the trouble involved in securing long-continued and concentrated attention.

5. Frequent change of rooms will much facilitate your work. In some schools visited there is not nearly enough of this. Your class should occupy two rooms during parts of every hour. This may compel you to change in the middle of a lesson, but you can so choose the lessons that the interruption will not be harmful.

6. Much aid to discipline is afforded by the drill of changing rooms, by simple calisthenic exercises and by exercise songs. But this aid is only secured by the enforcement of prompt and exact obedience.

7. Hence, the lightest tap of the bell should be followed by immediate and intense silence, not, however, permitted to continue long.

8. Hence, also, the first word of each command must be so chosen and given as to suggest invariably what is to follow; the next and finishing word of the command must be the signal for the prompt, universal, and, therefore, simultaneous execution of the command.

9. Hence, also, no second command should be given until the first has been universally and precisely obeyed.

10. Finally, the effect of each command must be minutely considered beforehand. For example, in a series of commands those

first given should be those that can be executed noiselessly, the whole series being terminated by that one which necessarily involved disturbance.

TEACHING.

1. You must yourself be accurate. The distinction between the well educated and the improperly educated, is just here, that the one is, and the other is not, automatically and minutely correct in recollection, in mode of thought, in manner of expression. Do not teach anything that must be subsequently unlearned.

2. With little children, especially at the outset, much attention must be given to them individually. This, however, in many instances, can be done so as to interest others, not directly addressed, who may be appealed to give the information that their companions requires.

3 The effect of every collective lesson is greatly increased when every child attends to the whole lesson. But this attention can be secured only by making each child feel that in all you say you have reference to him.

4. Hence, recitations and other exercises must not be wholly, nor even principally, simultaneous. No more convincing evidence of inexperience on the part of a teacher is needed than the general inability of a class to repeat individually, what in concert, or rather following the lead of one or two, they can in sing-song style deliver simultaneously.

5. In questioning a class, you should not give it to be understood whether you intend to have the answer from the whole class or from any particular pupil until after your question has been asked and a moment's pause for reflection and recollection has been allowed. After the pause, you may say, "John Brown," or "any one," and then expect an instant answer. Thus you prevent one or two higher pupils suggesting the answer to all the rest of the class, and you secure the attention of each to the work in hand.

6. Take care that each child gets a fair share of questioning. Sometimes the teacher has a few names that somehow spring first to the tongue, and their owners get the lion's share of attention. When the teacher is conscious of this, let her make sure of each child occasionally by some such device as the following: Let the whole class stand, and as questions are answered by individuals, let them sit. Thus proceed until every child is seated.

7. Holding up the hand to indicate the wish to reply to a question is open to great abuse. Forward children answer everything. Timid or indifferent children answer nothing. It is a good rule that the hand shall not be held up except when another pupil has made a mistake or when the teacher, in asking a question that she thinks a little too hard for the class generally, gives special permission to raise it.

8. Rising from the seat, running after the teacher, thrusting the hand into the teacher's face, snapping the fingers, are highly improper acts, instances of each of which I have seen as importunate efforts to attract the teacher's attention. At times the teacher, by standing so that she cannot see the whole class, is the direct cause of such rudeness.

9. It is impossible to carry on work with the active co-operation of the teacher in two classes at once. Having given one class an exercise on the slates, or one of some other kind, that has been properly explained, that is within their power, and the result of which can be subsequently examined by yourself, bend your undivided attention on the other class.

10. In the examination of slate work, it is, as a rule, better that children bring it to the teacher, than that the teacher go to examine it. Hence, in every room pupils should be taught how, without marking time, or marching noisily, to move in single file before the teacher, showing work as they pass slowly, and then to return in order to their places, having completed the circuit of the room.

11. Home work is not needed in preparatory classes. It will much conduce to good order, therefore, if books, slates and pencils be always left in school under the care of the teacher.

12. The Preparatory Limit Table should be interpreted rather as a maximum than as a minimum.

READING.

1. Use cards frequently for individual as well as for simultaneous reading.

2. Do not confine yourself to the set order of words. Pick out words here and there; read backward as well as forward.

3. I had supposed the teaching of reading by spelling thus, "emm" "eo" "me," "ee" "double-gee" egg, to be obsolete; really, I find it only obsolescent. If a word be analyzed at all, for purposes of reading, it should be by the powers and not by the names of the letters.

ARITHMETIC.

1. If you have not an abacus that stands on feet, ask for one.
2. Use the abacus yourself, but let the children use it constantly.
3. Do not aim to go beyond the limit, 20.
4. Let every kind of relation among numbers be taken with each successive number; i.e., do not teach addition first, and then subtraction, multiplication and division in succession, but teach all these operations, as mentally performed, simultaneously. Thus, that three and three are six, that three taken from six leaves three, that twice three are six, that three is the half of six, and that three is contained in six twice, are but different ways of regarding the same fact.

COMMON THINGS—OBJECT LESSONS—STORIES—SINGING.

1. See that you have, use yourself and set the children to use scales and weights, a two-foot rule, a clock card, and a compass.
2. Object lessons must be very simple, but they ought to be, none the less on that account, carefully prepared. It is a painful thing to see a teacher standing before a class puzzled to know what to do or what to say next.
3. Similarly, a story should be prepared beforehand. Great interest will be added if the teacher simply illustrate her story by drawing on the black-board as it proceeds.
4. In questioning children in all subjects, the aim should be to get connected answers of some length, but this can only be very slowly accomplished.
5. Teach children to sing distinctly, but not too noisily. The musical effect of a perpetual bawl is even worse than that of a perpetual whisper. It is no harm to have an occasional *ff* passage, but then let us also occasionally have *pp*.

MISCELLANEOUS.

1. Stand so that you can see all the children of the class, and so that each one of them can see, when necessary, what you do and how you do it. Sometimes it is well to overlook children from behind.
2. Be not noisy. Speak distinctly and quietly, so that children will listen to hear you; do not shout, so that they must hear you whether they will or no. Even if a busy hour of work (pleasant to hear) fill the room, do not raise your voice too much; call attention by a light stroke of the bell before you speak, then speak in the midst of a profound silence. Pointers and rulers were not made for banging desks with. Teachers' feet have other purposes than stamping on the floor.
3. Be not fussy. Self-possession, that quietly takes note of all surroundings, and that adjusts itself unruffled and without effort to them all, is the secret of easy government, as it is also the last refinement of the perfect gentleman.
4. Look out for short-sighted children, and for children who are hard of hearing. These physical imperfections are often unknown to the children themselves, and long escape the notice of parents and teachers. Unfortunately, not only do they give an appearance of stupidity to children that are really bright, but they most seriously retard progress unless compensated by the considerate arrangements of the teacher. Let as many exercises as possible cause the children to lift the eyes up from books to maps, pictures, objects at a distance and work done on the black-board, so that the tendency to shortsightedness may be, so far as possible, checked.
5. Embrace eagerly any opportunity that may be afforded you of visiting the classes of other preparatory teachers. I have seen some excellent work done in some of them, and in almost all the work is good. There is not a single class in which I have not seen at least one thing done so well that I could wish all other teachers of the same grade had an opportunity to see it.

SELECTIONS FOR MEMORIZING.

FIRST BOOK CLASSES.

1.

Only a drop in the bucket,
But every drop will tell;
The bucket soon would be empty,
Without a drop in the well.

Only a poor, little penny,—
It was all I had to give;
But as pennies make the dollars,
It may help some cause to live.

God loveth the cheerful giver,
Though the gift be poor and small;
What does He think of His children,
When they never give at all?

2.

Dare to be honest, good, and sincere,
Dare to please God, and you never need fear.

Dare to be brave in the cause of the right,
Dare with the enemy ever to fight.

Dare to be loving and patient each day,
Dare speak the truth, whatever you say.

Dare to be gentle and orderly too,
Dare shun the evil, whatever you do.

Dare to speak kindly, and ever be true,
Dare to do right, and you'll find your way through.

3.

Be good, my friend, and let who will be clever;
Do noble things, not dream them all day long.
And so make life, death, and that vast forever,
One grand, sweet song.

SECOND BOOK CLASSES.

1.

THE BIBLE.

Thou truest friend man ever knew,
Thy constancy I've tried;
When all were false, I found thee true,
My counsellor and guide.
The mines of earth no treasures give
That could this volume buy;
In teaching me the way to live,
It taught me how to die.—George P. Morris.

2.

He prayeth well who loveth well
Both man and bird and beast;
He prayeth best who loveth best
All things, both great and small;
For the dear God who loveth us,
He made and loveth all.—Coleridge.

3.

Beware the bowl though rich and bright
Its rubies flash upon the sight,
An adder coils its depths beneath,
Whose lure is woe, whose sting is death.
—Alfred B. Street.

4.

We live in deeds, not years—in thoughts, not breaths—
In feelings, not in figures on a dial;—
We should count time by heart-throbs. He most lives,
Who thinks most—feels the noblest—acts the best.—Bailey.

THIRD BOOK CLASSES.

1.

God moves in a mysterious way,
His wonders to perform;
He plants His footsteps in the sea,
And rides upon the storm.
Deep in unfathomable mines
Of never-failing skill,
He treasures up His bright designs,
And works His sovereign will.

Ye fearful saints, fresh courage take;
The clouds ye so much dread
Are big with mercy, and shall break
In blessings on your head.

Judge not the Lord by feeble sense,
But trust Him for his grace;
Behind a frowning Providence
He hides a smiling face.

His purposes will ripen fast,
Unfolding every hour;
The bud may have a bitter taste,
But sweet will be the flower.

Blind unbelief is sure to err,
And scan His work in vain;
God His own interpreter,
And He will make it plain.—*Cowper.*

2.

Press on! surmount the rocky steeps;
Climb boldly o'er the torrent's arch;
He falls alone who feebly creeps,
He wins who dares the hero's march.
Be thou a hero! let thy might
Tramp on eternal snows its way;
And through the ebon walls of night,
Hew down a passage unto day.

FOURTH BOOK CLASSES.

1.

Who is thy neighbor? He whom thou
Hast power to aid or bless;
Whose aching head or burning brow
Thy soothing hand may press

Thy neighbor is the fainting poor,
Whose eye with want is dim;
Oh, enter then his humble door
With aid and peace for him.

Thy neighbor? Pass no mourner by,
Perhaps thou canst redeem
A breaking heart from misery;—
Go share thy lot with him.

2.

Work! and pure slumbers shall wait on thy pillow;
Work! thou shalt ride over care's coming billow,
Lie not down wearied 'neath woe's weeping willow,
Work with a stout heart and resolute will!
Work for some good, be it ever so slowly;
Work for some hope, be it ever so lowly,
Work! for all labor is noble and holy.—*Mrs. Osgood.*

3.

In the world's broad field of battle,
In the bivouac of Life,
Be not like dumb, driven cattle!
Be a hero in the strife!

Trust no Future, howe'er pleasant!
Let the dead Past bury its dead!
Act,—act in the living Present!
Heart within, and God o'erhead!

Lives of great men all remind us
We can make our lives sublime,
And, departing, leave behind us
Foot-prints on the sands of time,—

Foot-prints that perhaps another,
Sailing o'er life's solemn main,
A forlorn and shipwrecked brother,
Seeking, shall take heart again.

Let us, then, be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labor and to wait.—*Longfellow.*

FIFTH BOOK CLASSES.

1.

The glories of our birth and state
Are shadows, not substantial things;
There is no armour against fate,
Death lays his icy hands on kings:
Sceptre and crown
Must tumble down,
And in the dust be equal made
With the poor, crooked scythe and spade.—*James Shirley.*

2.

Walk with thy fellow-creatures. note the rush
And whisperings amongst them. Not a sprig,
Or leaf, but hath his morning hymns; each bush

And oak doth know I am.—Canst thou not sing?
O leave thy cares and follies! go this way
And thou art sure to prosper all the day.
Serve God before the world; let Him not go
Until thou hast a blessing; then resign
Thy whole unto Him, and remember who
Provided by wrestling ere the sun did shine;
Pour oil upon the stones, weep for thy sin,
Then journey on, and have an eye to heaven.—*Henry Vaughan.*

3.

It is not growing, like a tree,
In bulk doth make man better be;
Or standing long, an oak three hundred year,
To fall a log at last, dry, bald, and sere,
A lily of a day
Is fairer far in May,
Although it fall and die that night;
It was the plant and flower of light.
In small proportions we just beauties see,
And in short measures life may perfect be.—*Ben Jonson.*

4.

So live, that when thy summons comes to join
The innumerable caravan, that moves
To the pale realms of shade, where each shall take
His chamber in the silent halls of death,
Thou go not, like the quarry-slave at night,
Scourged to his dungeon; but sustained and soothed
By an unfaltering trust, approach thy grave
Like one who wraps the drapery of his couch
About him, and lies down to pleasant dreams.
From "Thanatopsis," by William Cullen Bryant.

Notes and News.

ONTARIO.

At the entrance examination to the Fergus high school 37 candidates presented themselves, 9 of which passed and one was recommended.

In St. Thomas all the old staff in Public Schools are continued, and the following new ones for the new schools just erected are engaged:—Miss Augusta Flack, Miss Christina Patterson, Miss Matilda Bruntz, Miss Edith Parlie, Miss Etoile Comfort.

In the Dundas Public Schools the places occupied by Misses Regan, Lyons, and McGorman, as teachers are now held respectively by Mr. A. S. Brown, Miss Knowles, (late of Brantford) and Miss Clark. The changes came into effect on the 1st inst. The number of pupils in the High School continues to increase. A Literary and Scientific Society in connection with the Schools possesses a Reference Library and Museum, and issues a paper called the "Dundas High School Journal."

The Seaforth High School begins its fourth year under favourable auspices. One hundred students and the upper classes crowded. Thirty-one Candidates passed the last entrance examination. The three masters of last year are retained at advanced salaries, \$1200, \$700 and \$600 respectively.

No change in the Staff of Teachers in the Whitby Schools. Mr. Ed. S. Shrapnel, A. C. A., has been engaged by the Board of Education to teach drawing.

Only one change in the staff of the Morrisburg Model School. Miss Herbick being succeeded by Mr. Frank Lyle. In the Iroquois Public School Miss Mills is attending Normal School, is succeeded by Miss Jennie Elliot, and Mr. A. A. Whitaker by Mr. Wm. Johnston. In Ohesterville, Mr. C. B. Rao by Mr. Andrew Hamilton, Mr. J. P. Bogart by Mr. Miles Edgerton. The staff of the West Winchester P. S. have been re-engaged.

Mr. Neil Robertson fourth year Student of the Toronto University, has been appointed Classical Master of the Perth Collegiate Institute.

Mr. J. S. Jamieson, M. A., has been appointed English and Science Master of the Perth Collegiate Institute for the current year.

Mr. E. L. Curry, B. A., Head Master of Grimsby High School, has been re-engaged at his former salary of \$1000. Mr. C. C. Kemp, undergraduate of Toronto University, has been appointed his assistant in place of Mr. T. J. Walrond, resigned.

At Kirby, Mr. Shaw who is a general favorite amongst the scholars was presented with a handsome present on the closing day of School.

The friends of Education in the Town of Durham, South Grey

are taking steps to have a High School established there, with the adjoining territory as a High School district.

Mr. McFaul has been appointed principal of the Ingersoll Model School at a salary of \$850. We congratulate the people of Ingersoll on the appointment.

Presents from pupils to teachers are forbidden by the Hamilton Board of Education.

Mr. W. Atkin, from St. Thomas Central School, has been appointed to St. Catharines Collegiate Institute, at \$800.

Dr. S. H. Fee has been elected chairman of the Kingston School Board for 1882.

There are many vacancies in Schools throughout the County Kingston through the impossibility of securing teachers. If "permits" are not issued, in all probability the children will have to go uneducated.

Mr. Hamilton, assistant Classical Master in the Brantford Coll. Inst., has been replaced by Mr. Simon. Mr. McGill takes the position of Head Master in the Separate School. Miss Knowles, a very efficient Teacher, has left the Central for a good position in the Dundas Schools.

Mr. Harris was elected Chairman of the Guelph Separate School Board for the year, and Mr. Keough, Secretary.

Mr. J. G. Morris commenced as Teacher at Williamsburg under very favorable auspices. The attendance being over 40.

A growing movement for popularizing and diffusing elementary scientific and technical education in the British Isles is evidenced by the appointment of three learned scientists in England to proceed to America for the study of the system of technical education there.

The following School Board appointments have been made:—Harriston—Mr. R. Gillhuly, Chairman; Mr. S. Robertson, Secretary. Mount Forest—Mr. E. B. Boselly, Chairman; Mr. J. G. Smith, Secretary. Arthurville—Mr. R. Henderson, Chairman; Mr. J. Martin, Secretary. Listowel—Mr. Newman, Chairman; Mr. L. Bolton, Secretary. Clifford—Mr. K. M. Walton, Secretary. Drayton—Mr. W. H. Whalley, Secretary.

No single element of education seems to one, more important than the mother tongue. It seems to arouse and develop the intellectual nature of a child as nothing else can.—*Bayard Taylor*.

Mr. Passmore, B. A., of Brantford, has been appointed Head Master of Port Dover High School.

Mr. Dugald L. Campbell is appointed to Union Public School.

The appointment of Miss Bertha Philip to Dexter Public School gives general satisfaction.

Mr. James Smith from St. Thomas Collegiate Inst., to a School near St. Mary's. Salary, \$450.

A struggle is going on in many counties between the qualified teachers and the local Inspectors on the question of "extensions" and "permits," which obtain so largely in the Eastern Counties. This "cheap-teacher" system has long been a sore point.

A school trustee, of Lindsay, Mr. Barron, after visiting the High School, described the building, at the Board meeting, as being utterly unfit for use by children, and that he would not allow a child of his own to go there. His remarks were entirely corroborated by Mr. Belcher. A resolution to call on the Town Council for \$8000, to put the High School in a "proper healthy and habitable condition" was carried, after a weighty discussion, by the Board.

Mr. W. E. Sprague, of Cobourg, in retiring from teaching and joining the medical profession, was presented with first class medical works to the value of \$40, by his late pupils.

The position of Dominion Naturalist, will in future be filled by Prof. Macoun, of Belleville.

At a recent meeting of the London Board of Education, the salary of Mr. W. S. Milner, Classical Master of the High School, was raised from \$800 to \$900 per annum.

The Napanee High School is now held in the new premises, Roblin's Hall, the number in attendance at present being over 90. Although in the event of a large influx of pupils, fears may be entertained of the building supplying adequate accommodation, yet at present the interior of the building is well adapted for its purposes. Its surroundings are excellent, and render the location one of the finest in Ontario. In the Public Schools of the West Ward extensive and important alterations have been made, which will tend materially to increase the efficiency of the premises and the comfort of both teachers and pupils. The West Ward teaching staff consists of Mr. Jas. Bowerman, H. M., and Misses Mair, Walsh, Balantine, Fraser, and Aylesworth. The East Ward staff consists of Mr. Black, and Misses Anderson, Deltor, and Phalen.

We are pleased to notice that Mr. Wismer's labours in Parkdale, have received tangible recognition in the shape of an increase of salary. Our readers will find an interesting article from Mr. Wismer, containing many valuable hints, in our correspondence column.

Notwithstanding very unfavorable weather a good number of visitors attended the public school examination of S. S. No. 9, Clarke. The examination was conducted by Mr. W. C. Allin, the teacher. A most satisfactory programme was gone through by the children, which clearly evidenced the great progress made under their present teacher, and the fact that he was re-engaged for the coming year being intimated by one of the Trustees, was received with evident gratification by all present.

The Rev. J. Tierman, in his report of the Separate School Board of London, complains very much of the irregularity which characterizes the attendance in their schools; which he cannot but attribute to the carelessness of parents and guardians. When it is considered that 55 pupils attended less than 20 days, and 334 less than 100, no wonder can be expressed at his complaint. Financially the report was most satisfactory, and measures are about being taken for the erection of new school premises at St. Peter's Cathedral, which will reflect credit on the city.

At a recent meeting of the Whitby Board of School Trustees, both members of the Board, and Mr. Brown, the Teacher of the Model School, expressed themselves very favorable to Gago's new series of School Books.

The cost of Teachers' salaries in the Brampton High School last year, amounted to \$3,050.34, and for the Public Schools, \$3,400, or together \$6,450.34. This is half of the entire taxes levied in the town. It will be necessary at no distant date to increase this amount, as already additional class-room accommodation is required, 135 pupils having often to be squeezed into a room which is only adapted for 72.

Mr. W. J. Loudon, B. A., the gold medalist in mathematics, of 1880, has been added to the teaching-staff of the mathematical department of Toronto University. Sarnia High School can boast of having on its staff the gold medalist in mathematics of 1881.

The examination and subsequent entertainment held in the school at Maplewood, were a great success. The addresses by Messrs. P. A. McKenzie and V. Stock, teachers, also of Geo. McKenzie and W. Stock, were listened to with marked attention, indicating as they did, the great success attending the efforts of both teachers and scholars. Mr. D. Burke, Mr. Transom, and Miss Bean conducted materially to the success of the entertainment.

Mr. Hubbard, of Thamesford, has succeeded Mr. F. A. Lewis in the school at Richmond.

Miss Mary Wallace, one of the most successful teachers in the County of Peel, has recently been appointed to the principalship of the Streetsville Public School. This is an unusual compliment to so young a lady teacher, but we are satisfied Miss Wallace will successfully maintain her well earned reputation.

The Morrisburg High School opens this year with brilliant prospects. The attendance was larger in 1881 than in the previous year, while its success at the last Intermediate Examinations placed it among the best High Schools in Eastern Ontario. The present teachers, J. McGregor, M. A., Head Master, and W. H. Irvine, B. A., Assistant, seem determined that the School shall become one of the best in the Province.

At the last "Entrance" examination held by D. A. Maxwell, Esq., I. P. S. for South Essex, at Kingsville, there were 25 candidates, ten of whom were successful. Some of the teachers are endeavoring to have this examination substituted for the Promotion Examination from the 4th to 5th Class.

NOVA SCOTIA.

The annual meeting of the Association for promoting University Consolidation took place on the 29th of December, in Y. M. C. A. Hall, Halifax. I. W. Longley, Esq., A. M., Barrister, presided. The report presented showed that the Executive Committee had prepared a pamphlet containing in a succinct form the chief arguments in favor of University Consolidation. Some 12000 copies of this pamphlet were in the way of being circulated. Dr. J. Gordon McGregor, Professor of Physics in Dalhousie College, moved a resolution in favor of Technical Education, which was adopted by the Association. The Association dined in the evening, with a large number of guests at the Halifax Hotel. Robert Sedgwick, Esq., A. M., Barrister at Law, acted as Chairman. Among the guests were Hon. A. G. Jones, Ex-Minister of Militia, Hon. J. S. D. Thompson, Attorney General, Hon. Judge James, Hon. J. F. Stairs, M. E. C., W. M. Blair, Esq., M. P. P., W. D. Harrington,

Esq., M.P.P., Dr. Allison, Supt. of Education. Stirring speeches in favor of the policy of Consolidation were delivered by several members of the Association, among others Messrs. Sedgwick (Chairman), Russel, Dr. McGregor, Prof. McDonald, and Longley, though the latter viewed the practical difficulties in the way as greater than did most of the others. Hon. Messrs. Jones and Stairs expressed their hearty sympathy with the movement. The Attorney General, Hon. Mr. Thompson, courteously expressed expressed dissent from several propositions advanced by other speakers. The Superintendent of Education briefly contrasted the forces of fact and sentiment arranged against each other in the struggle regarding Collegiate Education.

W. D. Harrington, Esq., M.P.P., for the City and County of Halifax, has introduced into the Legislature an act to secure better attendance at the Public Schools. It provides for compulsory attendance with a local option clause empowering the ratapayers of School Sections, and the Municipal Councils of incorporated Towns to bring its provisions into force in their respective localities.

MANITOBA.

The following is the staff of teachers in the Winnipeg Protestant Public Schools for the year commencing the first day in February, viz.:—W. A. McIntyre, E. A. Garratt, J. D. Hunt, A. Springer, E. A. Blakely, Miss Shore, Miss Wright, Miss McEwen, John Acheson, N. Hewitt, John Reid, F. Shore, F. E. Kerr, Miss Harvey, Miss McIlroy, Miss M. Eyres, Miss Roblin, Miss A. Eyres, Miss Hargrave, Miss McInnis. The promotions which the first eight of these have received are well deserved, Messrs. Hewitt, Shore, and Kerr having been doing excellent work at St. Paul's, Balmoral, and Sturgeon Creek respectively. Altogether, the staff is a very superior one, and great things are expected of it. As has been already stated, Mr. John B. Somerset, Inspector of Schools for the County of Lincoln, Ont., was unanimously elected to fill the position of Inspector of Schools for the city, rendered vacant by the resignation of Mr. J. H. Stewart. The position is one of great and growing importance, and it is felt by all who know Mr. Somerset that he is just the man for it.

Mr. John B. Ferguson was, at the last meeting of the Protestant section of the Board of Education, appointed Inspector of Schools for Springfield and parts adjacent—the position held till very recently by Rev. Alex. Matheson. The Superintendent of Education, in moving the resolution embracing the appointment, said that he desired in this way to mark his high sense of the value of the services rendered by Mr. Ferguson during the time he has held the position of principal teacher in the city schools.

At a recent meeting of the Board of Education, the following resolutions were, on motion of Rev. W. C. Pinkham, seconded by His Grace the Archbishop of St. Boniface, and Rev. Professor Cherrier respectively, unanimously adopted, viz.:—1. That in order to meet the demands upon the Board for the support of schools now in existence, as well as the large number that we believe will be opened during the current year, it is necessary that the grant on the credit of the school lands be increased to thirty-five thousand dollars for the present year, independent of the sum which may be voted by the Local Legislature. 2. That in consequence of the rapid rise in the value of land in the Province, the following gentlemen be a committee to enquire what school lands may seem to have reached a maximum value, and to report to this Board; and further, to prepare, for the consideration of this Board, an address to the Dominion Government, to be presented through the Local Government, relating to the sale of the lands, viz.: His Lordship, the chairman, convener, His Grace Archbishop Tache, the Superintendents of Education, Rev. Dr. Rice, Rev. Prof. Hart, and Messrs. Mulvey, Kittron, M.P.P., and Col. Kennedy.

REVIEWS.

MODERN SCHOOL GEOGRAPHY AND ATLAS.—PREPARED FOR THE USE OF SCHOOLS IN THE BRITISH PROVINCES.—AUTHORIZED BY THE MINISTER OF EDUCATION FOR ONTARIO.—TORONTO, CANADA PUBLISHING COMPANY, LIMITED.—It has not been our custom to review the books used in the schools of Ontario, lest criticism might be interpreted to mean an attack on the Department, or attributed to interested motives. The letter of our correspondent which appears in another column has led us, however, to begin a task which we promise to complete, viz.: a careful examination of some of the books at present on the list which evidently should have no place there. We sat down with

the intention of reviewing the book under consideration, but space forbids our doing so in a single issue of the JOURNAL. We followed the generally recognized rule in teaching geography, and began with the study of our own country. If a Canadian Geography should be accurate in any portion it should certainly be in that part devoted to Canada. In this book there are five pages devoted to Canada and Ontario. This we hold to be much too little, but it is certainly enough of its kind. The Minister of Education very properly requires that the books used in Ontario shall be adapted to such a purpose. Why was the rule relaxed in this case? Why is a book that has nearly three hundred errors on the five pages relating to Canada and Ontario alone, authorized for use in the Schools of Ontario?

We have confined our attention almost entirely to the letter press in the present notice, but will give further attention in future numbers. The blunders in English alone to be found in it, will form a sufficient cause for the removal of this work from the list of authorized text-books which it now disgraces. We ask our readers to bear in mind that the following mistakes occur on five pages. We give them in the order in which they occur instead of classifying them, so that those who wish may compare with the book itself. If three hundred mistakes occur in five pages our readers can easily compute the number that will be found in the entire book.

In the list of provinces, page 13, no notice is taken of "Cape Breton" forming a part of Nova Scotia; "Keswatin" is termed a "District," (it should be spelled Keswaydin); and, "the North-West Territory was formerly called Hudson Bay Territory." These three errors occur in the opening paragraph on the Dominion of Canada. On the same page "Ontario" is classed as part of "an immense tract of level or gently undulating prairie land with only a few trees along the courses of the rivers, frequented by vast herds of buffalo."

Then follow such egregious blunders as: "the Lakes and River St. Lawrence," "The principal mountain ranges are the Rocky Mountains, and the Cascade Range in British Columbia," "In British Columbia the Peace River flowing into the Mackenzie River," "The St. Lawrence or Simpson River, and the Columbia River passing into the United States," "In the North-West Territory the Mackenzie formed by the junction of the Athabasca and Peace Rivers, flowing into the Arctic Ocean," "The Assiniboine, flowing into Lake Winnipeg and thence by the Nelson into Hudson Bay." Who ever heard before of the Cascade Range Mountains? Or of the Simpson River flowing into the United States? What a fine sight it must be to see the Assiniboine, Red, and Saskatchewan rivers sailing down the Nelson! How surprised the *voyageur*, familiar with the North-West from the 49th to the 70th parallel, will be to learn that his ideas concerning the Peace and Mackenzie rivers are all wrong! The Hoang-ho has altered its course—so has the Oxus—so have other notable rivers, but Nature or Art always loaned a helping hand. Alas! how far behind the times are the people of the Old World! What an amount of labor and turmoil, of time and money might have been spared them had they but possessed the magic pen of our Front Street author and critic! One simple wave of his delicate hand and the Assiniboine enters Lake Winnipeg; the Mackenzie becomes five hundred miles longer; the Winnipeg river ceases to exist; the Churchill, Nelson, Severn, Albany, Red, &c., are transported from their own native valleys and located somewhere in the North-West Territory. So the St. Lawrence rolls proudly on into the Atlantic; the Restigouche plunges into the Gulf of St. Lawrence.—Facts all new to Canadians.

So, also, Lake of the Woods, Lakes Winnipeg, and Manitoba are set "in the west, in the North-West Territory," and Lakes Abitibi and Mistassini "in the east" of the same Territory. How "the gentlemen resident in the various provinces" who edited the book must have performed their tasks!

Of the same ilk are: "In Ontario are Lakes Superior, Huron, St. Clair, Erie, Ontario, Simcoe, Nipissing, and Nipigon" (surely this settles the Ontario boundary question, by making it include even more than Mr. Mowat claims); "In Quebec Lake Temiscaming." This latter is not only wrongly located but also improperly spelled. "New-

foundland" is included among the Canadian Islands, "on the east coast."

We are also told that "The climate of Canada is healthy" (We hope the climate may continue in good health. Perhaps a State doctor might be appointed to give the climate a pill regularly); and that "In the east it is colder than the west—the temperature of Ontario being continued from Manitoba westward, although nearly 700 miles farther north."

Strange climate—"colder east than west" and yet the same—Nor are we told what is "700 miles farther north." Further on we are told that "the thermometer sometimes ranges, in winter, from 30° to 40° below zero." No mention is made of the climate save this. Small wonder that Englishmen think the Canadians live under ground, when the authorized Canadian Geography describes the climate of Canada in the above terms. This description reads like a quotation from an English newspaper. Special pains have been taken to state that the St. Lawrence is frozen over five months in the year.

Why was such a geography ever authorized in a Canadian province?

Passing over such absurdities as: "The Great Pacific Railway, extending from Montreal to British Columbia;" "Quebec is peopled principally by descendants of the original French settlers, some of whom are also to be found in the other provinces," the Indian lands have their own villages and houses," &c., &c.; we shall direct the reader's attention to the paragraph on the Constitution of our Government. "The Dominion form of Government is the same as that of Great Britain." This is the Queen's English we suppose? "It consists of Her Majesty the Queen, represented by the Governor-General, and a Parliament, consisting of the House of Commons and the Senate." The Queen is the "Dominion form" of government? She is growing stout, that is a satisfaction. She is "represented by the Governor-General and a Parliament"? Many people suppose we are governed by a Parliament, composed of the House of Commons, the Senate, and last the Queen's representative, the Governor-General. Similar errors occur in the explanation of the Ontario Legislature, page 17.

Again we are told "The Provinces were united under the name of the Dominion of Canada, on the 1st July, 1867." On referring to the list of provinces we find eight named. Therefore the only inference is that these eight were united on July 1st, 1867. Perhaps the student is to follow the plan of the book, i. e., learn the truth by having errors presented.

Trifling errors, as: "Canada was first discovered by Jacques Cartier, in 1535"—abound on all sides; so this one will be analysed as a sample. If Cartier was the "first discoverer" of Canada, all good authorities place the year of his arrival at 1534; but he was not the "first discoverer." The learned editor does not seem to know that Canada includes the maritime provinces, but thinks it still consists of Ontario and Quebec. Without referring to the certain discoveries and settlements of Scandinavians on Canadian shores centuries before Cartier's time, all will admit the honor of discovering Canada belongs to Cabot, who explored our seaboard in 1497. Equally reckless and wide of the facts is the statement that "Quebec and Montreal were the first towns founded by the French." Port Royal, the present Annapolis, was founded several years before either of the named places, and continued first in importance for many years. It is evident that the Rip Van Winkle editor went asleep before the Dominion was formed, as Canada is repeatedly referred to as including only Ontario and Quebec.

Why does the Minister of Education continue to permit the use of this book in Ontario?

We shall ask the reader to refer to the Geography in question, when he will find that these sixty odd errors in fact, occur on two pages of the work; and almost as many more have been overlooked as of minor note.

Space will not permit of more than a cursory review of Ontario, for on three pages in the text-book devoted to this province, over two hundred errors occur—more than one-half the number being mis-statements of fact or of order, and the remainder being important omissions of facts. Attention is, however, directed to the following:

"Ontario, formerly called Western Canada." Ontario lies "west and south of the Ottawa River," contains "forty-six counties." Duf-

ferin County is omitted entirely. "Victoria," "Haliburton," "Peterboro'," "Hastings," and "Lennox" counties are located "on Lake Ontario." "Bothwell," "Monck," and "Cardwell" are spoken of as "counties" in three separate places; then we are told, "they are, properly speaking, only Parliamentary Ridings."

What is a "Parliamentary Riding?"

The great lakes, lying between Canada and the United States, are again said to be in Ontario. Their location, according to the oracle, is as follows: These lakes "occupy the hollow between the water-sheds, from which the rivers of the North-West Territory to the north, and those of the United States to the south, flow." Query—Where is this North-west Territory?

"Lako Superior is remarkable for the extensive copper and silver mines on its shores." Such remarkable inferences as this are found over and over again throughout the book.

The River Kamin istiquia is not mentioned in Ontario or elsewhere but the following does occur: "From Fort William a road has been constructed which, with some stretches of navigation, extends to Manitoba." On turning to the map we are not surprised, but somewhat mystified to see that Fort William is within the boundaries of Manitoba, the province with which it is connected by road and water stretches. Besides, according to the text, both "the road" and the "stretches of navigation" extend to Manitoba. The "St. Mary River" and "Sault Ste. Marie Rapids" are spoken of, the author being seemingly ignorant that the names are the same, and are used interchangeably according to the whim or nationality of the writer. "Lake Simcoe is drained into Georgian Bay by the River Severn." Thus our most beautiful of Ontario inland lakes—Couchiching—is wiped out of existence. Following this mode of defining—Lake St. Clair is drained into the Atlantic Ocean by the River St. Lawrence. Further on, "Lake Huron flows into Lake St. Clair"—this must be a fine sight—and "Lake St. Clair is a shallow lake with a strong current."

Mitchell is not mentioned as on the Thames River; nor is that part of the river from Oxford County passing Woodstock and Ingersoll even hinted at. The Sydenham River is passed over—its name being entirely ignored. Important towns, as "Cayuga," "Fergus," &c., are treated with contempt—no notice being taken of them in the list of Grand River towns. "Below Grand and Navy Islands a series of fierce rapids begin," is good composition compared with the rest of the book. In describing the Falls the author details one scene viewed by few tourists, viz.: "the whole volume of the river is precipitated over the Falls." We feel confident it would require more than the orthodox "50c." to get a view of this wonderful scene. However, "it recovers itself and then flows with a smooth but rapid course towards L. Ontario."

After naming the Trent, Moira, and Napanee, we are told: "The other rivers are numerous but small." Inference—the Napanee is large?

Oakville, Whitby, Oshawa, Bowinville, and Brighton (the latter famous for its harbor), are omitted from the list of towns on L. Ontario, but to make up for their loss, Rochester, Oswego, and Sackett's Harbor are classed among "the principal Canadian towns on Lake Ontario."

Again, "Large quantities of—ashes—are annually exported," and "melons" are "extensively cultivated." "Grapes, melons, and peaches" are the only fruits in Canada, according to this instructive work.

To whatever paragraph the attention turns mistake on mistake, blunder on blunder, impropriety on solecism, and solecism on barbarism are encountered. Eyen Toronto is not properly described, "Toronto was one of the Capitals of United Canada before Ottawa was chosen." The union of Upper and Lower Canada is referred to as the "United Canadas" by all good writers, and the term "United Canada" is reserved for Canada since Confederation. Again, Ontario is referred to as "the upper province;" both Hamilton and London are situated in the western peninsula, see pages 15 and 17, yet Hamilton is styled "the second city in Ontario in population and commercial importance," and London "the principal city in the peninsula." This ranks Toronto third. Further on: "St. Catharines is a favorite resort for invalids and for summer residence" is inserted to illustrate how perfectly a master mind can apply the English language.

Did time permit, the information (?) concerning the mineral products of Canada—especially Ontario, would be dealt with; but a mere reference to the omission of any mention of the plumbago, phosphate, or iron mines throughout this province is all space affords. Kingston is slighted, no account being given of the "Loyal Military College," or of the "Penitentiary." Only one tribe of the Six Nations is mentioned. Some railways (two) are mentioned in the text, and the ordinary reader need only glance over the map to detect error on error in the location of the roads there outlined. There is no definition of a Province, a County, or a Town, nor of the functions pertaining to each. The "county towns," as such are not named: the "united counties" are not named; yet is it not of importance in many departments of life to know that Lennox and Addington, Northumberland and Durham, Leeds and Grenville, Dundas, Stormont and Glengarry, and Prescott and Russell are the united counties in Ontario? The canals are not classified. The courses and centres of commerce are not specially noted. The great inland lakes and rivers which form a net-work throughout the province, of invaluable service to the lumbermen, the farmer, &c., are not set forth.

The following towns and villages of more importance than many named are omitted entirely: Thamesville, Ridgetown, Dresden, Vienna, York, Pt. Maitland, Ft. Erie, Chippawa, Queenston, Grimsby, Beansville, Merrittton, Waterdown, Ancaster, Burlington, Yorkville, Parkdale, Leslieville, Markham, Thornhill, Weston, Ailsa Craig, Wardsville, Glenora, Komoka, Drumbo, Palmerston, New Hamburg, Elmira, Hespler, Arthur, Harriston, Harrisburg, Erin, Oil Springs, Wingham, Brussels, Teeswater, Flesherton, Stayner, Shelburne, Port Perry, Fenelon Falls, Campbellford, Haliburton, Norwood, Lakefield, Rondeau, Saugeen, Scarboro', Stouffville, Vankleek Hill, Loughborough, Lucknow, Minden, Morpeth, Woodbridge, Odessa, Orangeville, Orono, Highland Creek, Keene, Kemptville, Kingsville, Leamington, London East, Forest, Georgina, Hagersville, Heidelberg, Alliston, Bayfield, Clifford, Coldwater, Cookstown, Embro, Fingal, Wellington, Concession, Marmora, Deseronto, Bridgewater, Almonte, Lanark, Exeter, Blyth, Warton, Waterford, Watford, Penetanguishene, Pickering, Richmond Hill, Ridgeway. Many of these are incorporated towns. How can such a book be said to be adapted for use in Ontario? Yet the immaculate G. M. Adams gazes fondly on it and the other books edited by himself, and in the most "independent" manner pronounces them to be perfect. Perfect with 100 errors on a page!

We have said nothing about the general make up of the book. The maps are inaccurate and badly executed, the printing is inferior, the paper is poor, the binding is of the most discreditable character, and is done in such a style as to benefit the publisher much more than the parents of the children who use the books. The Minister of Education has control of these matters, and on him rests the responsibility for the disgrace of having such a book in our schools. There is not one of the many American Geographies which is not infinitely superior to it in every respect. Lovell's new geographies, while not all that could be desired, are greatly superior to it in most respects, especially in typography and binding.

The sooner the Minister of Education takes action in regard to this remarkable compilation, which has been palmed off as a Canadian production to the great discredit of Canada, the better for himself and his country. By longer allowing its use, he becomes an associate in misleading and injuring the pupils of our schools.

THE NORTH AMERICAN REVIEW.—We have received the February number of this ably conducted monthly, which is now in the sixty-seventh year of publication. The first article on "Do the Spoils Belong to the Victors," by the President of Cornell University, is upon reform of the civil service in the United States. The second, "A Remedy for Railway Abuses," has an interest for Canada as well as the United States. The author points out what these abuses are, discusses the solutions that have been proposed, and suggests that the entire matter of railway transportation should be placed in the hands of the people of the United States. The third article, on "Reputation in Virginia," is clearly and forcibly written. The fourth, on "The

Lancet and the Law," is a violent attack on compulsory vaccination, the writer endeavoring to prove that vaccination is no preventative of small-pox, and that the introduction of vaccine into the human system poisons and corrupts the blood. The last article, on "The Christian Religion," by Prof. Geo. P. Fisher, should be carefully read and re-read. A great mistake was made by the Editor of the *Review* when he asked, some time ago, a contribution on Religion by Col. Ingersoll and gave insertion to it. It was too coarse for the pages of such a periodical, and the arguments against Revealed Religion were too superficial to command respect or attention. The present contribution is from an opposite stand-point, is written with great perspicuity; the tone is attractive, the range of thought traversed is extensive, and the effect must be to convince the disciples of Christ that they have not followed a cunningly devised fable when they received the Scriptures of the Old and New Testament as the Word of God.

THE MONOGRAPH.—This is the title of a serial collection of Indexed Essays, published fortnightly. Each number is occupied with one essay. The numbers before us treat of Captain Kid; The Legend of Frederick Barbarossa; The British in India; and Calvin and Senectus. The articles are pleasantly written.

MAGAZINES.

HARPER'S WEEKLY continues "For Cash Only," and "Christowell." "Resurgo," a comedy by "Ouida," was begun in No. 2307. Quite a variety of subjects are dealt with, as "The United States Essay Office at New York," "Mount Washington," "The New Sea-wall of San Francisco," "Loss of the Jeannette," "The Aesthetic Visitor, Oscar Wilde," &c. The last month's numbers have been excellent.

THE MIDWINTER (FEBRUARY) CENTURY.—After the new cover, the first "midwinter issue" of *The Century* is chiefly distinguished by its usual range of popular contributions, whose names of themselves awaken in the reader the desire to see their contributions. Of these are Ralph Waldo Emerson, Henry W. Longfellow, the late Dean Stanley, Mrs. Burnett, Mr. Howells, Frank R. Stockton, "H. H.," E. C. Stodman, H. C. Bunner each of whom has its special audience. Add to those attractive names the other features: a fine frontispiece portrait of George W. Cable, author of "Old Creole Days" and "The Grandisimes," engraved by Cole, with a sketch by Col. Waring; another of the unique and amusing "Tile Club" papers, illustrated by ten of the members of the Club, the text (somewhat abridged) of Mrs. Burnett's play of "Esmeralda," now running successfully at a New York theatre; an illustrated account of the growing sport of Lawn Tennis, with full directions, a review of "The Significant Features of the Atlanta Exposition" by Edward Atkinson, Esq., who, we believe, was the prime mover in that enterprise, and a beautifully illustrated paper on "The Phidian Age of Sculpture"—and it will be soon that the number contains rare elements of popularity.

ST. NICHOLAS FOR FEBRUARY opens with a story of the adventures of a Mexican prince, illustrated with a beautiful frontispiece by F. H. Langren. Other short stories are: "The Man in the Moon," a tale full of humor, by Sophie Swett, with pictures by George D. Brush; "The Round Stone," a Hungarian folk story, contributed by the Hon. Jeremiah Curtin, and strikingly illustrated by Alfred Bressan; "Cornwallis's Buckles," an incident of Revolutionary times, in which figure a small girl, a cow, and the English commander in-chief—the illustrations being by G. W. Edwards; and "Lady Ann's Valentine," a tale full of interest and tender feeling, by Sarg and Flint, with a fine picture by Frank T. Merrill. "Men and Shows, and How They are Moved About," is the title of an entertaining article by William O. Stoddard; crammed with information about the doings and fittings of circus-menageries. There are many illustrations to this, the first half of the article; the conclusion, which is to be even more fully illustrated, is printed for the March number. "Mrs. Mary Mapes Dodge, the editor relates in this month's installment of her serial, "Donald and Dorothy," a gallant rescue by the hero, who bravely stops a runaway horse that was bearing off the heroine, a picture of the exciting scene being furnished by Frank T. Merrill, and Edward Eggleston, in his serial, "The Hoosier School-Boy," carries the young people of the story through stirring scenes of frontier school-life, as it was in his own boyhood; a fine picture, by George D. Brush, adorns the present instalment. Dr. Eggleston also describes, in a short article, "A Curious Drama" which he saw in London, and in which Mr. George MacDonald and his family represented scenes from the second part of the "Pilgrim's Progress," of John Bunyan. Mr. Harry M. Kelfer, in "Recollections of a Drummer-Boy," gives graphic accounts of camp-life in winter during the late war, and of the terrible scenes on the field after a battle; the illustrations are by Allen C. Redwood. Several poems and humorous verses, besides comical single pictures, help to enliven the pages of this number. The "Very Little Folks' Department" has a short illustrated story by Charles Barnard; "Jac. in-the-Pulpit," the "Letter-Box," and the "Riddle Box," are full of short and interesting paragraphs, letters from young readers, puzzles, etc., and there is a long Report concerning the St. Nicholas Agassiz Association, which now has 1,700 members.

THE POPULAR SCIENCE MONTHLY.—The contents for February are: "The Seven World-Problems," by Emil Du Bois-Reymond; "How Animals Breathe," by H. L. Fairchild (illustrated); "Dreams and the Making of Dreams," by J. Mortimer Granville, M.D.; "Sanitary Relations of the Soil," II., by Dr. Max von Pettenkofer; "Longevity of the Oyster," by Professor Samuel Lockwood; "A Glimpse Through the Corridors of Time," by Robert S. Hall, LL.D., F.R.S.; "Epidemic Convulsions," by David W. Yandell; "Extension of the Signal Service," by Prof. J. Trowbridge; "The Fundamental Problems of Physiological Chemistry," by Dr. Edmund Droschel; "A Botanist of the Ninth Century," by C. Hartwich; "Wild Animals as Man's Associates," by Professor E. S. Morse; "The Philadelphia Academy," by J. S. Kingsley; "A Little Matter," by A. E. Outerbridge, Jr.; "Vibration of Rocks in Pataasco Valley," by Frederic Garretson, M.D.; Sketch of Sainte Claire Deville (with portrait); Entertaining Varieties; Correspondence, Editor's Table, "The Practical Study of Mind"; Literary Notices; Popular Miscellany; Notes.

Publishers' Department.

CORRESPONDENCE.—Subscribers desiring solutions to problems or answers to questions, would confer a favor by writing the questions on separate sheets and not mixing them amongst business matters.