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THE RECENT EXAMINATION PAPERS.

To the Editor of the "Journal of Education."

SIR,—It has occurred to me that, if you could find room in the *Journal of Education* for a few notes on the recent examination papers in Algebra and Natural Philosophy, they might be of service to teachers who are preparing themselves to compete for first class certificates. I have, therefore, drawn up a few such notes, which I now send you.

You will, perhaps, allow me to take this opportunity of noticing a statement which was published, during my absence from Toronto, in one of the city papers, to the effect that all the difficult theoretical questions in Algebra, in the examination for second class certificates, were taken from Sangster, and none from Todhunter, though Todhunter's Algebra for beginners, equally with Sangster's Algebra, is authorized for use in the Public Schools. This is a trifling complaint,—so very trifling, that, on my return to Toronto, two weeks after the charge had been made, I did not think it necessary to address any communication, in reply, to the newspaper in which it appeared; but a few words on the subject may, perhaps, lead those who may hereafter feel themselves impelled to undertake the part of criticising the examination papers, to exercise some care in regard to their statements.

The complaint is that all the difficult theoretical questions in the second class papers in Algebra were taken from Sangster; none from Todhunter. People would naturally suppose, from such a statement, that the paper contained a large number of theoretical questions. The fact is, that there were only four theoretical questions in it altogether. Of these, one, the last in

the paper, was not taken into account in fixing the total number of marks on which the average prescribed by the Council of Public Instruction, in order that a candidate may receive a certificate of a certain grade, was calculated. This question, therefore, could be an injury to no candidate, though it might be a benefit to some. Of the remaining three theoretical questions, one was taken neither from Sangster nor from Todhunter; and the other two are found in Todhunter, as well as in Sangster. And, to crown all, though Todhunter is authorized as a text-book to be used in schools, Sangster's Algebra is the only text-book specified by the Council of Public Instruction in their programme for the examination of teachers. In the revised programme for the examination and classification of teachers, prescribed on the 28th of March, 1871, under the heading, "Minimum qualifications for second class Provincial certificates," will be found the following:—"Algebra: To be acquainted with the subject as far as the end of section 153, page 129, of the authorized text-book (Sangster)."

I have not named the gentleman on whose letter I have been commenting, because I wish, as far as possible, to avoid personal controversy. My object is simply to prevent statements, which are unfounded, from being received throughout the country.

I am, Sir, your obedient Servant,

GEORGE PAXTON YOUNG.

TORONTO, 7th Sept., 1871.

EXAMINATION FOR FIRST CLASS PROVINCIAL CERTIFICATES OF QUALIFICATION AS PUBLIC SCHOOL TEACHERS, COMMENCING 1ST AUGUST, 1871.

ALGEBRA.

Note 1.—The question 2 (c) is the first in the paper that presents any difficulty. It was correctly solved by Mr. W. H. Ross, though his solution was wanting in simplicity and elegance. From the manner in which x and y are involved in the given equations, it is easily seen that, if we assume $y = tx$, and substitute this value of y , x will be obtained in each of the equations in its first power. It may, therefore, be eliminated; and the resulting equation in t will be a quadratic.

Note 2.—Question 4, though by no means difficult, was solved by very few of the candidates. A correct solution was given by Mr. T. B. Woodhull. The following extract from his papers will be sufficient to show his method:—

Let x = rate per hour of first.
 y = rate per hour of second.

$$\frac{6}{x} - \frac{6}{y} = \frac{1}{2}, \quad \frac{6}{x + \frac{2}{3}} - \frac{6}{y + 1} = \frac{1}{2}.$$

Having found these two equations he works them out in the ordinary way.

Note 3.—The question 5 (c) was solved by only one gentleman, Mr. James C. Thompson. The simplest method of solving it is:—

Let $x, \frac{2xy}{x+y}, y$, be the quantities in H. P.

Then, $4(x+y)^2 = 25xy$.

And, $4xy = (x+y)^2 - (x+y)$;

after which, the whole course is plain sailing.

Note 4.—A greater number of solutions than I expected were given of the questions 8 (a) and 8 (b). The following answer to 8 (a) is taken from the papers of Mr. John Cameron; and the answer to 8 (b) from the papers of Mr. P. Mactavish.

8 (a). Mr. John Cameron.

From equation,

$$x = -m + \sqrt{m^2 - n}.$$

$\sqrt{m^2 - n}$ is imaginary, when $n > m^2$; and real, when $n < m^2$. Hence we see that $N = m^2$, as it comes under the same conditions. The roots are the same when $n = N$.

8 (b). Mr. P. Mactavish.

Let, $x^2 + px + q = 0$, have roots B, y .

Then, $B + y = -p$.

Mr. Mactavish gives the proof of this, which may be omitted. He also proves that—

$$By = q.$$

Take now equation, $x^2 + rx + s = 0$. Let its roots be B, n .

It can be proved, as in the other equation, that

$$B + n = -r,$$

$$\text{and } Bn = s.$$

$$\text{Now, } B + y = -p \quad (1)$$

$$B + n = -r \quad (2)$$

$$y - n = r - p, \quad (2) \text{ subtracted from } (1).$$

Hence the difference of their roots $= r - p$.

$$\text{Again, } \frac{By}{Bn} = \frac{q}{s}$$

$$\frac{y}{n} = \frac{q}{s}.$$

NATURAL PHILOSOPHY.

Note 5.—The question 3 (b) presented difficulty to some of the candidates, because there is no rule given in the text-book by which it can be directly solved. At the late Normal School examinations a similar problem was pronounced insoluble, for want of sufficient data, by a considerable number of the students examined. I intentionally set the question, in the August examination, in the form in which it appears, in order that candidates might be taught to emancipate themselves from the bondage of rules committed to memory, and might be thrown back on principles. The following solutions are taken from the papers of Mr. John Cameron and Mr. Andrew Hay respectively.

Mr. John Cameron's solution.

When sunk the tendency of the wood to rise is $31.5 - 11.7 = 19.8$ oz., as it detracts that much from the weight of the copper. Hence weight of water it displaces $= 70 + 19.8 = 89.8$; and $70 \div 89.8 = .779 +$ is specific gravity.

Mr. Andrew Hay's solution.

Weight of equal volume of water $= 70 + 31.5 - 11.7 = 89.8$
 $\therefore s = \frac{70}{89.8} = .779.$

Note 6.—I have found that a large number of candidates for first class certificates have most indefinite conceptions as to how the velocity of a body, which is moving with a variable velocity, is, at any instant, to be estimated. I, therefore ask attention to the following answer to question 6 (a), by Mr. James C. Thompson, in which the only defect is, that the pronoun *it*, in the expression "if it were constant," is, perhaps, somewhat vague. Mr. Thompson means the velocity acquired.

"When a body moves with a variable velocity, the velocity at

each instant is estimated by the space through which, if it were constant, the body would pass in a second of time. A body falling by the force of gravity to the earth has acquired a velocity of 96 feet means—that, the force of gravity ceasing, the body would be carried through 96 feet in the second."

Note 7.—Question 8 was attempted by a number of candidates, but not successfully solved by any. It was assumed by those who tried the problem, that the additional pressure on the air in the tube is due to a column of mercury 4 inches high. But as the air in the tube has suffered compression, its lower surface is not 4 inches below the surface of the mercury in the vessel.

SPIRIT OF SOME TEACHERS IN REGARD TO THE RECENT EXAMINATIONS.

As an indication of the admirable spirit in which some of the teachers of the Province look upon the recent effort to elevate the character of their profession by the recent examinations, even although the result was adverse to themselves, we give an extract from a letter, among many, received by the Education Department on the subject. The writer says:—

"I may take this opportunity of expressing my thanks to Dr. Ryerson and his colleagues, for the many blessings conferred upon us (Teachers) as a class, by the new School Act; and although many of my fellow-teachers strongly condemn the stringent measures adopted by the new Boards of Examiners, I consider it the only effectual way of raising the standard of education, and also the position of the teachers, throughout the country. Previous to the new Examining Board, I received from the County Boards, at different times, five 1st Class Certificates, but in July last, I received only 3rd Class! Still, I am perfectly satisfied with my examination, and, therefore, I wish them all success."

Another Teacher says:—

"As my friends in my native county have requested me to accept the office of Public School Inspector for that county, and trusting that I might prove to be more useful in that capacity there, than as teacher here, it would have afforded me much pleasure to have acceded to their wishes, had I possessed the necessary legal qualifications, but in consequence of not having lately practised some of the branches required, I shall not be prepared to pass a critical examination at present.

"As a practical teacher, who has not lost a single day for 20 years, although excluded from this office myself, I beg most heartily to congratulate you upon the success of your unremitting exertions in elevating the position of the teacher, as well as the wisdom displayed in limiting this office as a reward for those only who are talented and worthy."

EXAMINATION PAPERS FOR SECOND PROVINCIAL AND THIRD CLASS CERTIFICATES OF QUALIFICATION AS PUBLIC SCHOOL TEACHERS, HELD UNDER THE REGULATIONS OF THE COUNCIL OF PUBLIC INSTRUCTION, COMMENCING 25TH JULY, 1871.

ENGLISH GRAMMAR—SECOND AND THIRD CLASS.

NOTE.—Candidates for third class certificates will answer the first twelve questions of this paper; and it is recommended to the local examiners that the per centage of marks, necessary in order that a candidate may pass, be taken on the value of these questions diminished by the number of marks assigned to questions 9 and 10. Candidates for a second class certificate will omit 2, 7, 8, and 10, and the analysis in 12, and will answer the remainder of the third class paper, together with their own special paper; and it is recommended that the per centage of marks necessary in order that a candidate may be ranked of a certain grade, be taken on the whole value of this work, diminished by the number of marks assigned to questions 13 and 14.

1. Define ABSTRACT NOUN; PERSON; RELATIVE PRONOUN; IMPERSONAL VERB.
2. (a) What are the various modes of distinguishing the Masculine and Feminine gender?
 (b) Give the feminine of *marquis, stag, buck, executor*.
3. Write the plural of *cargo, canto, tyro, potato, echo, attorney, chimney, criterion, axis, genius, index, aide-de-camp*.
4. Explain the inflection 's in the Possessive Case.
5. Give examples of the Appositive to the Possessive.
6. How may a SIMPLE SUBJECT be changed into a COMPLEX?
7. In what light may any be regarded?
8. Give a list of Comparatives which want the Positive.
9. What rules are laid down to regulate the use of the relative "that"?
10. (a) Show that Intransitive Verbs are sometimes rendered Transitive.
 (b) Give Transitive Verbs corresponding with the following Intransitive Forms,—Rise, Lie, Sit, Fall.

11. Give the rule for the construction of the Predicate Noun, and state with what verbs it is most frequently connected.
12. Parse the italicized words in the following sentences, and analyze No. 3.
 - (1) His power and the number of his adherents declining daily, he consented to a partition of the kingdom.
 - (2) To die with honor is all I can now do for my country.
 - (3) It was proposed to him that, in the absence of all regular authority, he should allow himself to be appointed to the vacant office; but he was wiser than to undertake a charge so full of danger, and so likely to prove unavailing at last.
 In the preceding sentence, point out the object of *should allow*.

ADDITIONAL FOR CANDIDATES FOR SECOND CLASS CERTIFICATE.

13. Investigate the statement that "mine" and "thine" are the possessive case of the Personal Pronoun, whilst "my" and "thy" are the Possessive Adjective.
14. State the rule relating to "sequence of tenses" in connection with the conjunction "that;" and quote Latham's argument to show that the rule must necessarily be absolute.
15. Illustrate the use of the Adjective in Predicate, and state clearly its force and relation.
16. Examine the correctness of the following, giving in each case your reason for retaining or altering the construction:—
 - (a) The Prime Minister, with the Chancellor of the Exchequer, were admitted to an audience by the Queen.
 - (b) It is not fit for such as us to sit with the rulers of the land.—*Sir Walter Scott*.
 - (c) His Majesty was less daunted than I could expect.—*Dean Swift*.
 - (d) The Duke of Wellington is not one of those who interferes with matters over which he has no control.—*Wellington*.
 - (e) He cut his way gallantly through them and came off safe.—*Macaulay*.
17.
 1. You may as well go stand upon the beach,
 2. And bid the main flood bate his usual height;
 3. You may as well use question with the wolf,
 4. Why he hath made the ewe bleat for the lamb;
 5. You may as well forbid the mountain pines
 6. To wag their high tops and to make no noise
 7. When they are fretted with the gusts of heaven;
 8. You may as well do anything most hard,
 9. As seek to soften that—than which what harder?—
 10. His Jewish heart.

Merchant of Venice, Act IV., Scene I.

 - (a) Analyze from line 5 to the end.
 - (b) Parse the words in italics.
 - (c) Derive the words which are numbered.
 - (d) In line 6 do you notice any peculiarity?

GEOGRAPHY—SECOND AND THIRD CLASS.

This paper, as far as question 12, is intended for candidates both of the second and third class. In regard to the latter the paper may be considered a full one without 2 and 10, and the local examiners are requested to exclude the marks assigned to those two questions from the total on which they are to calculate the per centage prescribed by the Department. Candidates for a second class certificate may omit 4, 5, and 10, and the remainder, together with their own special paper, may be considered a full paper.

1. Define MERIDIAN; TROPICS; HORIZON (Sensible and Rational); ECLIPTIC; ZODIAC; OASIS; ESTUARY; DELTA.
2. Express in the most exact shape the conclusion arrived at with reference to the form of the earth, and show how this is established by different admeasurements of the length of a degree on the same meridian.
3. Where are the following metals found in the greatest abundance—Gold; Silver; Iron; Copper; Lead; Quicksilver?
4. Classify the different races of mankind, naming the divisions of the world where they are chiefly found, and giving, as nearly as you can, the total number of each class.
5. Give a list of the Third and Fourth Rate Powers of Europe, with their Capitals.
6. Into what bodies of water do the following rivers discharge themselves,—Oder; Ebro; Po; Petchora; Dniester; Shannon; Obi; Congo; Euphrates; Amoor.
7. State accurately the position of the following,—Astrakhan; Gothland; Archangel; The Naze; Lake Itasca; Parinari-bo; Buda; Strait of Yenikale; Coquimbo; Minsk; Sitka; Dijon; Tornea; Cape Matapan; Rio Janeiro; San Luis Potosi.
8. What Mountains between Europe and Asia? What Provinces South of Hungary? What Austrian Town at the head of the Adriatic? What Cape in South part of Sicily? What

large Island near the mouth of the Orinoco? What Province S. W. of Brazil? What City of South America on the Equator? What Islands E. of N. America in lat. 40° N? What State N. of Kansas? What Strait between Cape Breton and Nova Scotia? What River flows from Lake Simcoe into the Georgian Bay?

9. What countries of South America lie wholly, or in part, south of the Tropic of Capricorn?
10. Arrange in groups the Rivers of North America.
11. What Mountain-ranges on the Lower St. Lawrence?
12. Draw a map of Nova Scotia, Cape Breton, and Prince Edward Island, indicating with care the boundaries, and marking leading places as far as time may allow.

ADDITIONAL FOR SECOND CLASS.

13. Specify the great River Basins of Asia.
14. Enumerate the Colonial possessions of Holland.
15. Name the Presidencies of British India, with their principal divisions and chief cities.
16. Trace the course of the Ottawa, naming its tributaries and bordering counties on the Ontario side.

HISTORY.—SECOND AND THIRD CLASS.

Candidates for Third Class Certificates may omit all the questions under V., VI., VII., X. and XI.

- I. (1.) When does the history of the Jews first come into contact with that of Egypt?
- (2.) To which of the Persian monarchs is the name Ahasuerus applied in various parts of Scripture History?
- (3.) (a.) To what countries did the missionary labors of St. Paul extend?
- (b.) How was his life closed?
- II. (2.) (a.) Of what party among the Athenians was Pericles the representative?
- (b.) Who was his rival?
- (c.) Give the date of his administration, and describe its effect on the prosperity of Athens.
- (2.) (a.) Who were the "Thirty Tyrants?" By whom were they deposed?
- III. (1.) What efforts were made to restore the Tarquins?
- (2.) (a.) What event gave rise to the 2nd Punic War.
- (b.) Enumerate Hannibal's victories.
- IV. (1.) (a.) Who was Clovis?
- (b.) What name has been given to the dynasty founded by him?
- (2.) What speculation in the reign of Louis XV. caused great excitement in France, and bought thousands to ruin?
- (3.) With what event may the French Revolution be said to have commenced?
- V. In what battle were the fortunes of Charles XII., of Sweden, ruined?
- VI. (a.) In what contest did William of Orange, surnamed "the Silent," render himself conspicuous?
- (b.) Mention the leading incidents, and state the result of that contest.
- VII. (1.) State the circumstances which incited the American colonists to commence the War of Independence.
- (2.) (a.) Under whose administration, and in what manner, was Louisiana acquired?
- (b.) What was the extent of Louisiana at that time?
- VIII. (1.) Compare the claims of the Houses of York and Lancaster to the throne of England.
- (2.) When was the first Reform Bill passed? What extension of the franchise did it effect?
- IX. (1.) State the circumstances under which the first expedition of Jacques Cartier was undertaken.
- (2.) How did the "seigniorial tenure" originate?
- X. (1.) Describe the manner in which the First Partition of Poland was accomplished, and its effects. Date?
- (2.) (a.) How did Napoleon, after the battle of Marengo, testify his desire to conciliate Russia?
- (b.) What motive had he in so doing?
- (c.) What led Alexander I. to declare war against him?
- (3.) In what connexion do we find the collision between the *Leopard* and the *Chesapeake*?
- XI. (1.) Give the date of General Braddock's expedition, describe its disastrous result, and state the cause of his failure.
- (2.) During what period was the Earl of Elgin Governor-General of Canada? Sketch his career.

ETYMOLOGY.—SECOND CLASS.

NOTE.—Candidates for Third Class Certificates will answer the first seven questions of this paper; and it is recommended to the local examiners that the per centage of marks, necessary in order that a candidate may pass, be taken on the value of these questions diminished by the marks assigned to questions 6 and 7. Candidates for Second Class Certificates will omit 5, 6 and 7, and answer the remainder of the Third Class Paper, together with their own special paper; and it is recommended that the per centage of marks necessary in order that a candidate may be ranked of a certain grade, be taken on the value of this work, diminished by the number of marks assigned to question 12 and 13.

1. In what cases is the final consonant doubled before an affix ?
2. In the following words mark the accented syllable.—Advertisement, elegiac, opinionative, empyrean, sonorous, monosyllabic, anathema, mausoleum, horizon, diocesan.
3. Correct, where necessary, the spelling of the following:—Separate, harrassing, embarrassing, parallelogram, chicanery, belief, Huguenot, rociève, abstruce, absceind, impunc, inveagle, rhapsody, pthisic.
4. Mention prefixes, each in combination with some word, which denote rest and motion in time and place.
5. Give words in which the following affixes appear, and state the force of each affix:—"ism," "ling," "all," "ster," "ness," "acy," "ure."
6. Trace to their national origin:—Admiral, turban, scimitar, muslin, sago, sonnet, gazette, divan.
7. Derive the following:—Chimney, fascine, acoustics, vicissitude, gormandize, exaggerate, truth, forfeit, copse, synod.

ADDITIONAL FOR SECOND CLASS CANDIDATES.

8. In the following groups of verbs of similiar signification, indicate the appropriate use of each verb:—Esteem, estimate, appreciate; grant, allow, bestow, concede; build, erect, construct; usurp, arrogate, assume.
9. Give words of Latin and English origin corresponding with the following: Apology, catalogue, democracy, eulogize, mystery, prophesy, sympathy.
10. Mention words—two in each case—derived from these Latin roots:—Arceo, caro, colo (are), falx, fiscus, gelu, grex, orior, sinus, tuco.
11. Trace the following to Greek roots:—Disastrous, antoeratic, epidemic, analyse, amnesty, optics, oxygen, fraantic, empyreal, isothermal, polygon, system.
12. What do you understand by the "imperfect incorporation" of words introduced from a foreign language? State the principles which characterise it, and give examples.
13. (a) Explain the term "Hybridism," and illustrate by examples. (b) Show that *icicle* is hybrid in appearance only.

EDUCATION.—SECOND CLASS.

1. Discuss briefly the question, What is Education ?
2. What basis of classification would you adopt in an ordinary school? What elements besides mere proficiency would you consider ?
3. State briefly the utility of Botany as a subject of study in Public Schools.
4. What means would you adopt to secure the interests of your pupils in the work of the school ?
5. Give the principal arguments in favour of prizes in schools, and state what means you would adopt to reduce to a minimum the disadvantages of the prize system.
6. Name some of the uses and abuses of the monitorial system. What plan would you adopt in employing monitors in a Public School ?
7. Describe how you would teach (1) Dictation; (2) English Grammar to a class of beginners; (3) Algebra.
8. State the Law (a) as to the proceedings to be taken on the formation of a new School Section. (b) The principal duties of trustees in Rural Sections.

EDUCATION.—THIRD CLASS.

1. What is meant by School Organization ?
2. You take charge of a Rural School of 50 pupils, shew how you would proceed to classify.
3. Construct a Time Table for such a school.
4. Describe how you would proceed with a class beginning the study of Arithmetic.
5. What measures would you take to create an interest in the school throughout the section ?
6. State the leading points of the Law in regard to Public School Teachers and their duties.
7. Describe how you would teach:
 - (1) Dictation.
 - (2) English Grammar to a class of beginners.

ARITHMETIC AND MENSURATION—SECOND CLASS.

1. Explain fully how to state and solve a question in simple proportion. A grocer sells $14\frac{7}{10}$ oz. for a lb., how much does he cheat a customer who buys to the amount of \$73.92 ?
2. Give ex. of the difference between Simple and Compound Practice. Convert £296 16s. 10 $\frac{1}{2}$ d. sterling into Canada currency. The £ being worth \$4.86 $\frac{3}{4}$.
3. What vulgar fractions will produce finite decimals, and why ? Reduce to a decimal

$$\frac{\frac{2}{5} - \frac{1}{20}}{\frac{2}{5}} \times \frac{(8\frac{4}{7})^2}{12} + \left\{ (1 + \frac{1}{10}) \div (\frac{3}{2} + \frac{1}{4}) \right\} + \frac{2\frac{2}{3} - \frac{3}{10}}{17\frac{3}{4}}$$
4. A and B can do a work in 7 days, B and C in 8 days, and A and C in 9 days; in what time will (1) each separately, (2) all together, do the work ?
5. Explain fully the terms Numerator and Denominator. Prove that both terms of a fraction can be multiplied or divided by the same number without changing the value of the fraction. Examine whether the common definition of multiplication holds in the case of fractions.
6. Examine the different cases of profit and loss. A merchant asked 30 per cent. advance on cost of goods, but finally took 30 per cent. less than price asked; how much did he gain or lose per cent. ?
7. Show how to find the present worth of a debt payable at a future time without interest. I have 2,500 bls. of flour for sale, and am offered \$6.30 cash, or \$6.55 on 8 months. How much shall I gain by accepting the better offer, money being worth 8 $\frac{1}{2}$ per cent. ?
8. Define insurance, policy, premium. A person insured a house for $\frac{4}{5}$ its value at 1 $\frac{1}{2}$ per cent. annually; after paying 6 premiums the house was destroyed, the entire loss being \$1,945. Find value of house.
9. The police returns for a certain year give 1,350 male offenders, and 1,150 female; the next year's returns show a decrease of 5.4 per cent. in the number of male criminals, and an increase of 8.4 per cent. in number of female. Find increase or decrease per cent. in whole number of criminals.
10. A board is 3 feet wide and 6 feet long, find its area; show clearly that your multiplier is not concrete. Find cost of carpeting a room 22 feet 6 inches long by 17 feet 9 inches wide; the carpet being 27 inches wide, and \$1.60 a yard.
11. The sides of a right angled triangle are 30 feet and 40 feet respectively, find the perpendicular from the right angle upon the hypotenuse.
12. It is required to lay out 70 acres, 3 roods, 26 $\frac{3}{4}$ perches of land in the form of a rectangle whose length shall be three times the breadth. Find the dimensions.

ARITHMETIC—THIRD CLASS.

1. Write in figures and expressive words the numbers seven hundred and one units in the 6th period, fourteen in the 5th, one hundred and twenty in the 3rd, fourteen in the 2nd, and nine in the 1st.
2. Show that the corresponding operations in the simple and compound rules are based on the same principles. How many years, months, days, hours, and minutes from 20 minutes past 4 o'clock P.M., July 15th, 1862, to 25 minutes past 11 o'clock, June 29th, 1871 ?
3. State the principles on which is based the rule for finding the G. C. M. of two numbers. Apply them to find that of 3,621 and 1,581.
4. The driving wheels of a locomotive are $17\frac{1}{2}$ feet in circumference, and the trucks $10\frac{3}{4}$, what distance must the train move to bring wheel and truck into the same relative positions as at starting ?
5. State the general principles on which the rules of fractions depend; and find the simplest form of

$$(7\frac{3}{4} \div 5\frac{1}{4}) \text{ of } \left\{ 4\frac{1}{2} \times \frac{7}{8} \right\} + 1\frac{3}{8} \times (3\frac{1}{2} - \frac{9}{10}).$$
6. From the sum of $2\frac{1}{4}$ acres, $\frac{2}{3}$ of 3 $\frac{1}{2}$ acres, $\frac{9\frac{1}{2}}{25\frac{1}{2}}$ roods, and $\frac{2}{11}$ of 1 $\frac{1}{4}$ perches, take 4 acres 25 perches 12 square yards.
7. A man divided a farm among three sons; to the first he gave 80 acres, to the second $\frac{1}{3}$ of the whole, and to the third $\frac{1}{4}$ as much as to both the others. How many acres did the farm contain ?
8. Find the sum, difference, and product of 3.456 and .425.
9. Find values of 2.7345 according as the unit is £2 5s., or 5 acres, 2 roods, 10 perches, or 6 oz., 10 dwts., 16 grs.
10. Sold 20,900 feet of lumber for \$331.62 $\frac{1}{2}$, gaining thereby \$78.37 $\frac{1}{2}$. What had it cost per C ?

11. Explain the difference between simple and compound proportion. In Nova Scotia the sovereign is worth \$5, and in Ontario \$4.86 $\frac{2}{3}$; convert \$2,720.40 Ontario currency into Nova Scotia currency.
12. (a) Received \$4,100 from my agent, who had deducted his commission at 5 per cent., as proceeds of sale of goods; what were the goods sold at?
(b) Remitted \$4,100, including commission, to my agent to invest for me, on commission of 5 per cent.; what was his commission?

BOOK-KEEPING—SECOND CLASS.

1. Describe the Cash Book, Journal, Ledger, and Invoice Book.
2. You commence business with \$5,000 cash, and \$5,000 goods purchased from A. B. at 6 months. Show what accounts you would open.
3. What accounts would be affected, and how, by the following entries:—
(1) Sold goods to A. on account, \$500.
(2) Sold goods to B. to the amount of \$1,000, receiving \$600 cash and his note at 4 months, payable at Bank of Toronto.
(3) Bought goods from C., \$1,600, paying \$900 cash and giving my note at 4 months, payable at Bank of Commerce.
(4) Had B.'s note discounted at Bank of Toronto at 8 per cent.
(5) Received a legacy of \$800.
4. What is the object of the Profit and Loss account? When do you debit and when credit it?
5. Describe the steps you would take in closing a set of books.

ALGEBRA—SECOND CLASS.

1. Simplify the complex fraction $\frac{\frac{1}{1+a} - \frac{1}{1-a}}{\frac{1}{1+a} + \frac{1}{1-a}}$ (*Text book.*)
2. Resolve $a^{18} - x^{18}$ into its elementary factors. (*Text book.*)
3. Divide by Horner's synthetic method $6a^4 - a^3 + 2a^2 + 13a + 4$ by $2a^2 - 3a + 4$. (*Text book.*)
4. (a) Prove that the L. C. M. of two algebraical expressions is their product divided by their G. C. M. Does this rule hold good for more than two expressions? Illustrate.
(b) Find the L. C. M. of $a^3 - 9a^2 + 26a - 24$, and $a^3 - 8a^2 + 19a - 12$. (*Text book.*)
5. Prove that $x^m - 1$ is divisible by $x - 1$ without remainder, m being a whole number.
6. Solve the following equations:—
(a) $5m - \frac{2x}{3} - \frac{5(1-2m)(x-1)}{2} - \frac{20mx+1}{4} = 0$.
(b) $\frac{5}{x} + \frac{12}{y} - 97 = 0$, and, $\frac{1}{5x} - \frac{1}{12y} = \frac{1}{2}$.
(c) $x - y = a$, $x^2 - y^2 = b$. (*Text book.*)
7. "A certain number of two digits is such that when divided by 4 less than twice the sum of its digits, the quotient is three; but when divided by 5 more than the difference of the digits, the quotient is 13. Required the number, the right hand digit being the greater." (*Text book.*)
8. Two men A and B, dig a trench in $3\frac{3}{7}$ days. If A were to do more work by one third than he does, and B more work by one half than he does, they would dig the trench in $2\frac{2}{3}$ days. In what time would each dig it alone, at his present rate of work?
9. Prove that when the unequal quantities n and m have the same sign, $\frac{m}{n} + \frac{n}{m} > 2$.
10. Prove that in the arithmetical extraction of the square root of a number which is a complete square, after $n + 1$ figures of the root have been obtained by the rule, n may be obtained by dividing the last remainder by the last trial divisor. (*Text book.*)

NOTE.—It is recommended to the local examiners that the percentage of marks, necessary by the regulations of the Council of Public Instruction in order that a candidate may be ranked of a certain grade, be taken on the whole value of the paper diminished by the number of marks allowed to question (10).

EUCLID—SECOND CLASS.

1. If two triangles have two sides of the one equal to two sides of the other, each to each, but the angle contained by the two sides of the one greater than the angle contained by

the two sides equal to them, of the other, the base of that which has the greater angle shall be greater than the base of the other.

2. To describe a parallelogram equal to a given rectilineal figure and having an angle equal to a given rectilineal angle.
 3. If a straight line be divided into any two parts, the squares on the whole line, and on one of the parts, are equal to twice the rectangle contained by the whole and that part, together with the square on the other part.
 4. To describe a square that shall be equal to a given rectilineal figure.
 5. If a straight line touch a circle, and from the point of contact a straight line be drawn cutting the circle, the angles which this line makes with the line touching the circle shall be equal to the angles which are in the alternate segments of the circle.
- DEDUCTIONS.
6. If from any point D in AC , the base of a triangle ABC , which has the two sides BA and BC equal to one another, DE be let fall perpendicular on BC , the angle AEC shall be double of the angle EDC .
 7. Straight lines which respectively bisect two opposite angles of a parallelogram are either parallel or coincident.
 8. If from B , the vertex of a triangle ABC , which has the two sides AB and BC equal to one another, the straight line BD be drawn to a point D in the base AC , $AB^2 = BD^2 + AD \cdot DC$.
 9. Draw a straight line to touch each of two given circles.

NOTE.—It is recommended to the local examiners, that, in the above paper, the book work and two of the deductions be regarded as a full paper counting 100; and that the percentage of marks necessary by the regulations of the Council of Public Instruction in order that a candidate be ranked of a certain grade, be taken on the value of the paper thus reduced.

NATURAL PHILOSOPHY.—SECOND CLASS.

1. In a straight lever CBA , a weight W of 10 lbs. acts at B , a distance of 5 feet from the fulcrum A ; and the power P is applied at C , on the same side of the fulcrum as W , but in an upward direction. If AC be $12\frac{1}{2}$ feet, what is P ? And what is the pressure on the fulcrum?
2. Assuming the principle of virtual velocities, deduce therefrom the relation that must subsist between the Power and the Weight in the lever, in order that there may be equilibrium?
3. At points A, B, C , which are in the same straight line, weights of 8 lbs., 12 lbs., and 20 lbs. respectively, are placed. If AB be $12\frac{1}{2}$ feet, and BC be 5 feet, it is required to find the centre of gravity of the three weights.
4. (a) In a system of pulleys, where each pulley hangs by a separate string, what power will sustain a weight of 104 lbs., there being two movable pulleys in the system?
(b) If the weight of each of the two pulleys be $1\frac{1}{2}$ lbs., by what power will the weight of 104 lbs. be sustained, the weight of the pulleys being taken into account?
5. A weight of 80 lbs. is sustained on an inclined plane by a power of 60 lbs., acting parallel to the base. How many feet does the plane rise in the hundred?
6. What pressure will be exerted by a power of 20 lbs., acting on a differential screw, in which the power lever is 50 inches long, the pitch of the exterior screw $\frac{1}{11}$ of an inch, and that of the inner screw $\frac{1}{8}$ of an inch. (*Text-book.*)
7. What is the amount of pressure exerted against a mill dam, the part submerged being 10 feet wide and 80 feet long, and the depth of the water being 8 feet? (*Text-book.*)
8. (a) What is meant *uniformly accelerating force*? For instance, g being the force of gravity at the earth's surface, explain the formula, $g=32$.
(b) A body is falling to the earth at the earth's surface; what velocity has it acquired after descending for 6 seconds? And through what space does it fall in the succeeding second?
(c) At the surface of a planet, whose mass is such that the force with which bodies at its surface gravitate towards it is only one-fourth of the force of gravity at the earth's surface, a projectile is shot upwards with an initial velocity of 80 feet in the second. How high will it rise?
9. (a) Enunciate Boyle's law, determining the relation between the density of a gas and its elasticity.
(b) Describe the air-pump.
(c) Describe the barometer.
(d) A cylinder whose height is $1\frac{1}{2}$ feet, and the radius of its base 2 feet, contains as much air, as, under the ordinary

atmospheric pressure, would fill a hollow cube, one of whose edges is $\sqrt[3]{3.1416}$ feet. What is the pressure of the air in the cylinder on a square foot of the surface?

- 16. (a) One end of a uniform beam rests on the ground, the other end being supported in the hand of a man who exerts a pressure which is at right angles to the length of the beam, and in a vertical plane passing through the beam. Mention the different forces by which the beam is kept at rest.

* (b) If the weight of the beam be 200 lbs., and its inclination to the ground 60°, what force does the man exert.

NOTE.—It is recommended to the local examiners, that, in the above paper, the percentage of marks necessary, by the regulations of the Council of Public Instruction, in order that a candidate may be ranked of a certain grade, be taken on the full value of the paper, diminished by the number of marks allotted to the questions marked (*).

CHEMISTRY, BOTANY AND PHYSIOLOGY.—SECOND CLASS.

- 1. Distinguish an Elementary Substance from a Compound. Describe clearly what is meant by the combining weights of the Elements.
2. Give the symbols and combining weights of the fifteen elements which we have mainly to consider in Ag. Chemistry.
3. State and illustrate the law of multiple proportions.
4. What is Chemical Nomenclature? Give the force of the principal prefixes and terminations it employs.
5. State the principal properties of O. What different effects result from the union of O. with metalloids and metals?
6. Give the leading properties of chlorine. Account for its bleaching and disinfecting powers.
7. State what you know of the following: (1) Phosphuretted Hydrogen. (2) Caustic Potash. (3) Hydraulic Cement.
8. Name the organs of reproduction in plants, and describe their functions.
9. Give and fully describe the principal parts of the flower.
10. "In the adaptation of the food to the wants of the body, it is subjected to five different changes." Explain this statement fully.
11. Give the anatomy of the skin. Mention some of the uses of the article.
12. Give briefly the hygiene of the nervous system.

OPTIONAL PAPER FOR SPECIAL CERTIFICATE IN NATURAL HISTORY, BOTANY, AND AGRICULTURAL CHEMISTRY.

- 1. How are the Nematodes distinguished from Acrita? Name their classes.
2. Name the classes of the Heterogangliata and give their leading characteristics.
3. Enumerate the orders of the Aves, the tribes of the Passeres, and state how the Scansores differ from the other tribes of this order.
4. Name the parts of the pistils and stamens of a flower, and give their uses.
5. What are Perennial plants? Describe their mode of life.
6. "There are two great classes of stems, which differ in the way the woody part is arranged in the cellular tissue." Fully explain this.
7. Describe the functions of the leaves. How are leaves classified as to their veining.
8. Name and describe the organic constituents of plants.
9. How can you distinguish the organic from the inorganic constituents of soils, and determine their relative proportions?
10. "All kinds of manure should be under cover,"—explain the reason of this: if exposed to the open air, how would you prevent the escape of valuable fertilizing elements?
11. How may the defects of sandy soils be remedied? Those of argillaceous soils?
12. State the beneficial effects of drainage on soils.

COMPLETE ALGEBRAIC PROOF OF THE BINOMIAL THEOREM.

By J. C. GLASHAN.

For the Journal of Education.

(NOTE.—In the following paper = must be read "is (are) identical;" and R (y, 2 y, 3 y, ...) means "remaining terms in y^2, y^3, &c." R has no reference to a numerical value.

If n be a positive integer, by actual multiplication (or by induction if preferred),

(x^a - y^a) { x^a(n-1) + x^a(n-2)y^a + x^a(n-3)y^2a + ... } = x^na - y^na. (1)

(x + y)^n - x^n = { (x + y) - x } { (x + y)^{n-1} + (x + y)^{n-2}x + ... } = y { (x + y)^{n-1} + (x + y)^{n-2}x + ... } (2)

(x + y)^n = x^n + y { (x + y)^{n-1} + (x + y)^{n-2}x + ... } + x^{n-1} (3)

Similarly develop each term in (x + y)^{n-1} + (x + y)^{n-2}x + &c., and collect

(x + y)^n = x^n + nx^{n-1}y + R(y^2, y^3, ...) (4)

By (1),

(x + y)^{-n} - x^{-n} = { (x + y)^{-1} - x^{-1} } { (x + y)^{-n+1} + (x + y)^{-n+2}x^{-1} + ... } (5)

(x + y)^{-n} = x^{-n} - y { (x + y)^{-n}x^{-1} + (x + y)^{-n+1}x^{-2} + ... } + (x + y)^{-2}x^{-n+1} + (x + y)^{-1}x^{-n} (6)

Similarly develop each term in (x + y)^{-n}x^{-1} + (x + y)^{-n+1}x^{-2} + &c., and collect,

(x + y)^{-n} = x^{-n} - nx^{-n-1}y + R(y^2, y^3, ...) (7)

By (1), m being positive or negative—

(x + y)^{m/n} - x^{m/n} = { (x + y)^m - x^m } / { (x + y)^{m(n-1)/n} + ... } (8)

∴ by (2) or (3)—

(x + y)^{m/n} = x^{m/n} + { mx^{m-1}y + R(y^2, y^3, ...) } / { (x + y)^{m(n-1)/n} + ... } (9)

Similarly develop each term in the denominator and collect

(x + y)^{m/n} = x^{m/n} + { mx^{m-1}y + R(y^2, y^3, ...) } / { nx^{m(n-1)/n} + R(y, y^2, ...) } (10)

division,

(x + y)^{m/n} = x^{m/n} + { m/n x^{m/n-1}y + R(y^2, y^3, ...) } (11)

∴ by (2), (3), (4), for any portensive (real) value of n

(x + y)^n = x^n + nx^{n-1}y + R(y^2, y^3, ...) (12)

Let f(x) = Ax^a + Bx^b + Cx^c + &c.

f(x + y) = A(x + y)^a + B(x + y)^b + C(x + y)^c + &c., (expanding by (5)) = Ax^a + Bx^b + Cx^c + &c., + { Aax^{a-1} + Bbx^{b-1} + Ccx^{c-1} + &c. } y + R(y^2, y^3, ...) (13)

Let f'(x) symbolize the coefficient of y in (6); and f''(x), the function formed from f'(x) as it form f(x); f'''(x), that similarly formed from f''(x), &c.; thus: f(x + y) = f(x) + f'(x)y + R(y^2, y^3, ...) (14)

Multiply both sides into z - y and arrange the right hand in terms of y—

f(x + y)(z - y) = f(x)z + { f'(x)z - f(x) } y + R(y^2, y^3, ...) (15)

(x + z)^n = x^n + { (x + z)^n - x^n } / (x + z) - x^n (16)

and z are wholly independent of each other and may have any values given them. Substitute (x + y) for x and (z - y) for z; (x + z) thus remaining unchanged.

$$(x + z)^n = (x + y)^n + \frac{(x + z)^n - (x + y)^n}{(x + z) - (x + y)} (z - y).$$

For convenience write $f(x)$ for $\frac{(x + z)^n - x^n}{(x + z) - x}$, then $f(x + y)$ represents $\frac{(x + z)^n - (x + y)^n}{(x + z) - (x + y)}$, thus

$$(x + z)^n = x^n + f(x)z \tag{8}$$

$$(x + z)^n = (x + y)^n + f(x + y)(z - y). \text{ Expand by (5) and (7) and arrange in terms of } y.$$

$$(x + z)^n = x^n + f(x)z + \left\{ nx^{n-1} + f'(x)z - f(x) \right\} y + R(y^2, y^3, \dots)$$

For this to remain an identity the coefficients of $y, y^2, \&c.$, must vanish identically.

$$\therefore nx^{n-1} + f'(x)z - f(x) = 0. \tag{9}$$

Substitute $(x + y)$ for x , and $(z - y)$ for z , expand by (5) and (7), and arrange in terms of y .

$$\therefore nx^{n-1} + f'(x)z - f(x) + \left\{ n(n-1)x^{n-2} + f''(x)z - 2f'(x) \right\} y + R(y^2, y^3, \dots) = 0$$

For the left hand member to vanish identically, the coefficients of $y, y^2, \&c.$, must vanish identically,

$$\therefore n(n-1)x^{n-2} + f''(x)z - 2f'(x) = 0 \tag{10}$$

Repeat the operations and the reasoning by which (10) was obtained from (9) and $n(n-1)(n-2)x^{n-3} + f'''(x)z - 3f''(x) = 0$ (11)

$$n(n-1)(n-2)(n-3)x^{n-4} + f^{(4)}(x)z - 4f'''(x) = 0 \tag{12}$$

and by 'induction,'

$$n(n-1)(n-2)(n-3)\dots(n-m+1)x^{n-m} + f^{(m)}(x)z - mf^{(m-1)}(x) = 0. \tag{13}$$

Commencing with (9) and proceeding through (10), (11), (12), - - - (13), substituting successively for $f(x), f'(x), f''(x), \dots$, in (8) and the resulting identities,

$$(x + z)^n = x^n + nx^{n-1}z + f'(x)z^2$$

$$= x^n + nx^{n-1}z + \frac{n(n-1)}{1.2} x^{n-2}z^2 + \frac{f''(x)}{1.2} z^3$$

$$= x^n + nx^{n-1}z + \frac{n(n-1)}{1.2} x^{n-2}z^2 + \frac{n(n-1)(n-2)}{1.2.3} x^{n-3}z^3 + \frac{f'''(x)}{1.2.3} z^4$$

$$\dots$$

$$= x^n + nx^{n-1}z + \frac{n(n-1)}{1.2} x^{n-2}z^2 + \frac{n(n-1)(n-2)}{1.2.3} x^{n-3}z^3 + \dots + \frac{n(n-1)(n-2)\dots(n-m+1)}{1.m} x^{n-m}z^m + \frac{f^{(m)}(x)z^{m+1}}{1.m} \tag{14}$$

This, with the 'remainder' omitted, is the Binomial Theorem in the form in which it is usually given.

If $\frac{f^{(m)}(x)}{1.m}$ be developed each term after the first will be numerically between the corresponding terms of

$$\frac{n(n-1)(n-2)\dots(n-m)}{1.m+1} (x + z)^{n-(m+1)} \text{ and}$$

$$\frac{n(n-1)(n-2)(n-m)}{1.m+1} (x + z)^{n-(m+1)} \text{ and the signs (affections) will be the same, so we may assume } \frac{f^{(m)}(x)}{1.m}$$

$$= \frac{n(n-1)(n-2)\dots(n-m)}{1.m+1} (x + pz)^{n-(m+1)} \text{ in which } p \text{ is some proper fraction. This is a form into which the remainder may be thrown.}$$

If this form be substituted in the identity (14) it will give the expansion

$$(x + z)^n = x^n + \frac{n}{1} x^{n-1}z + \frac{n(n-1)}{1.2} x^{n-2}z^2 +$$

$$\dots + \frac{n(n-1)(n-2)\dots(n-m+1)}{1.m} x^{n-m}z^m + \frac{n(n-1)\dots(n-m)}{1.m+1} (x + pz)^{n-m-1}z^{m+1}$$

This last is not an identity, but if the right arithmetical value be given to p , the series will be arithmetically equal to the binomial. In the above, $f(x), \&c.$, have been used merely for convenience; if their actual values be substituted for them, (9), (10), - - - (14) will be seen to be identities. In this method (6) and (7) will not be needed.

I. Papers on Practical Education.

1. THE TEACHER'S VOICE.

Did you ever watch children at their favorite game of "Playing School?" If so, you must have observed that the child who personates the teacher is sure to issue his numerous orders in a peculiarly harsh and shrill tone of voice. The reason why is not far to seek. The little one is shrewdly observant of his elders, and has come to associate with the pedagogic business a harsh and artificial utterance.

A sweet and well-modulated voice is one of the teacher's best possessions; calm, full, and low pitched, it is a great aid in school discipline. Careful culture will do much to improve the quality and compass of the voice. We commend to the careful perusal of our readers the following entertaining and valuable essay by a distinguished English writer:

Far before the eyes, or the mouth or the habitual gesture, as a revelation of character, is the quality of the voice, and the manner of using it. It is the first thing that strikes us in a new acquaintance, and it is one of the most unerring tests of breeding and education. There are voices which have a certain truthful ring about them—a certain something, unforced and spontaneous, that no training can give. Training can do much in the way of making a voice, but it can never compass more than a bad imitation of this quality; for the very fact of its being an imitation, however accurate, betrays itself, like rouge on a woman's cheeks, or a wig, or dyed hair. On the other hand, there are voices which have the jar of falsehood in every tone, and that are as full of warning as the croak of the raven, or the hiss of the serpent. There are, in general, the naturally hard voices, which make themselves caressing, thinking by that to appear sympathetic; but the fundamental quality strikes through the overlay, and a person must be very dull indeed who cannot detect the pretence in that slow, drawing, would-be-affectionate voice, with its harsh undertone and sharp accent, whenever it forgets itself. But, without being false or hypocritical there are voices that puzzle as well as disappoint us, because so entirely inharmonious with the appearance of the speaker. For instance, there is that thin treble squeak we sometimes hear from the mouth of a well-grown, portly man, when we expected the fine rolling utterance which would have been in unison with his outward seeming; and, on the other side of the scale, where we looked for a shrill head voice, or a tender musical cadence, we get that hoarse chest voice, with which young and pretty girls will sometimes startle us.

Nothing betrays so much as the voice, save, perhaps, the eyes, and they can be lowered, and so far their expression hidden. In moment of emotion, no skill can hide the fact of disturbed feelings, though a strong will and the habit of self-control can steady the voice when else it would be failing and tremulous. But not the strongest will, nor the largest amount of self-control, can keep it natural as well as steady. It is deadened, veiled, compressed, like a wild creature, tightly bound and unnaturally still. One feels that it is done by an effort, and that if the strain were relaxed for a moment, the wild creature would burst loose in rage or despair, and the voice would break out into the scream of passion, or quiver away into the falter of pathos. And this very effort is as eloquent as if there had been no holding down at all, and the voice had left to its own impulse, unchecked. Again, in fun and humor, is it not the voice that is expressive, even more than the face? The twinkle of the eye, the hollow in the under lip, the dimples about the mouth, the play of the eyebrow, all are aids, certainly; but the voice! The mellow tone that comes into the utterance of one man, the surprised accents of another, the fatuous simplicity of a third, the philosophical acquiescence of a fourth, when relating the most outrageous impossibilities—a voice and manner peculiarly transatlantic, and, indeed, one of the Yankee forms of fun—do not we know all these varieties by heart? Have we not veteran actors, whose main point lies in one or other of these varieties? And what would be the drollest anecdote, if told in a voice which had neither play nor significance? Pathos, too,—who

feels it, however beautifully expressed, so far as the words may go, if uttered in a dead and wooden voice, without sympathy? But the poorest attempts at pathos will strike home to the heart, if given tenderly and harmoniously. And just as certain popular airs, of mean association, can be made into church music by slow time and stately modulation, so can dead-level literature be lifted into passion or softened into sentiment by the voice alone.

Certain voices grate on our nerves, and set our teeth on edge; and others are just as calming as these are irritating, quieting us like a composing draught and setting vague images of beauty and pleasantness afloat in our brains. A good voice, calm in tone and musical in quality, is one of the essentials for a physician; the "bedside voice," which is nothing, if it is not sympathetic by constitution. Not false, not made up, not sickly; but tender in itself; of a rather low pitch, well modulated, and distinctly harmonious in its notes; it is the very opposite of the orator's voice. Whatever its original quality may be, the orator's voice bears the unmistakable stamp of art, and becomes artificiality; as such as may be admirable—telling in a crowd, impressive in an address—but overwhelming and chilling at home, partly because it is always conscious, and never self-forgetting. An orator's voice, with its careful intonation and accurate accent, would be as much out of place by a sick-bed as court trains and brocaded silk for the nurse. There are certain men who do a good deal by a hearty, jovial, fox-hunting kind of voice—a voice a little thrown up, for all that it is a chest voice—a voice with a certain undefined rollicking sound in it, and eloquent of a large volume of vitality and physical health. The clerical voice, again, is a class voice; that neat, careful, precise voice, neither wholly made nor yet quite natural; a voice which never strikes one as hearty, or as having a really genuine utterance, but which yet is not unpleasant, if one does not require too much spontaneity. The clerical voice, with its mixture of familiarity and oratory, as that of one used to talk to old women in private, and to hold forth to a congregation in public, is as distinct in its own way as the mathematician's handwriting; and any man can pick out, blindfold, his man from a knot of talkers without waiting to see the square cut collar, and close, white tie. The legal voice is rather a variety of the orator's than a distinct species,—a variety standing midway between that and the clerical, and affording more scope than either.

The voice is much more indicative of the state of the mind than many people know of or allow. One of the first symptoms of failing brain power is in the indistinct or confused utterance, no idiot has a clear or melodious voice; the harsh scream of mania is proverbial, and no person of prompt and decisive thought was ever known to hesitate or to stutter. A thick, loose, fluffy voice, too, does not belong to the crisp character of mind which does the best active work; and when we meet with a keen-witted man, who drawls, and lets his words drip, instead of bringing them out in the sharp, incisive way that would be natural to him, we may be sure there is a flaw somewhere, and that he is not what the Americans call "clear grit" and "whole-souled" all through. We all have our company voices, as we all have our company manners, and we get to know the company voices of our friends after a time, and to understand them as we understand their best dresses and state service.

The person whose voice absolutely refuses to put itself into company tone, startles us as much as if he came to a state dinner in a shooting jacket. This is a different thing from the insincere and flattering voice, which is never laid aside while it has its object to gain, and which affects to be one thing when it means another. Though one of the essentials of a good voice is its clearness, there are certain lisps and catches which are very pretty, though never dignified; but most of them are exceedingly painful to the ear. It is the same with accents. A dash of brogue, the faintest suspicion of the Scotch twang, even a very little American accent—but very little, like red pepper, to be sparingly used, as, indeed, we may say with the others—gives a certain piquancy to the voice. Of all the European voices, the French is, perhaps, the most unpleasant in its quality, and the Italian the most delightful. The Italian voice is a song in itself, not the sing-song voice of an English parish school-boy, but an unnoted bit of harmony. The French voice is thin, apt to be become wiry and metallic; a head voice for the most part, and eminently unsympathetic; a nervous irritable voice, that seems more fit for complaint than for love-making; and yet how laughing, how bewitching it can make itself! There are some voices that send you to sleep, and others that stir you up; and the French voice is of the latter kind, when setting itself to do mischief and work its own will.

The cultivation of the voice is an art, and ought to be made as much a matter of education as a good carriage or a legible handwriting. We teach our children to sing, but we never teach them to speak, beyond correcting a glaring piece of mispronunciation or so; in consequence of which we have all sort of odd voices among us—short yelping voices like dogs, purring voices like cats, croak-

ings and lisps, and quackings, and chattering; a very menagerie, in fact, to be heard in a room ten feet square, where a little rational cultivation would have reduced the whole of that vocal chaos to order and harmony, and made what is now painful and distasteful, beautiful and seductive.—*Illinois Schoolmaster.*

2. ALPHABET STUDIES.

[Mr. Burritt has kindly furnished us these interesting extracts from his address at the recent dedication of the Burritt School in New Britain.]

I am in sympathy with the youngest pupils in our schools. If they find it hard to remember all the letters, let me tell them that I am a sixty year old boy, puzzling over new and strange alphabets every day of my life, and find it harder than they do to remember all the letters. I am sitting too on the lowest bench, in the very infant school department of learning, trying to spell *bag* and *baker*, *cat* and *dog* in several strange languages. If any of them get downhearted over their first lessons, I should like to show them my primer, and the queer letters I have to put away in my memory. Not a child here will be expected to master more than twenty-six letters, while I have to remember more than a thousand, or letters in more than a thousand different shapes. As I travelled east and south, in the languages from Iceland to India, I found their letters growing more and more wild and strange in shape, size and number. When I reached Ethiopia, I found about one hundred and sixty to master. But every one of these stood out fair and square by itself, and I could take hold of it by the right end and put it away in my memory, "right side up with care." But when I got as far as India, and grappled with that old mother of languages, the Sanskrit, I had to meet a whole regiment of letters, marching down upon me by platoons, or rather by squads of threes, fours and fives, all so locked or stuck together that each squad was like a walking bundle of heads, legs, arms and walking sticks; so that one could hardly tell which of them led the van of a word. Besides a large contingent of regular letters, more than two hundred and sixty of these bristling squads of consonants meet you at the very gate of the language, and you have to force your way through them before you can get into it. Now, every day I have to break through many bands of these gnarly and knotted consonants to make a single step in the language. So, perhaps, there is no man in the country of my age who has more of children's experience in learning and mastering alphabets than myself; and no one who enters the youngest school will be younger in primary learning than I am to-day. *Conn. School Journal.*

II. Papers on Railways.

1. THE RAILWAYS OF CANADA.

There are in the Dominion of Canada over twenty lines of railway at present in operation. Their aggregate length is about 3,000 miles. The following are the names of the lines and their respective lengths:—

	MILES.
Great Western and branches.....	360
Grand Trunk.....	872
Northern.....	99.53
Buffalo and Lake Huron...(G. T. R.).....	162.27
London and Port Stanley.....	25
Erie and Ontario...(G. W. R.).....	17
Ottawa and Prescott.....	54
Montreal and Champlain.....	177.76
Carillon and Grenville.....	12.75
St. Lawrence and Industry.....	12
Midland.....	89
Welland.....	25
Brockville and Ottawa.....	63.54
Standstead, Shefford and Chambly.....	28
Cobourg and Marmora.....	23
Nova Scotia.....	217
Windsor.....	32
Windsor and Annapolis.....	85
Wellington, Grey and Bruce.....	21
New Brunswick and Canada.....	126
European and North American.....	147.25
Quebec and Gosford.....	26
Total.....	2,679.10

To these may be added the following lines now in course of construction:—

	MILES.
Southern.....	200
Toronto, Grey and Bruce	120
Toronto and Nipissing.....	90
Muskoka Junction (about).....	50
Air Line (about).....	60
Intercolonial (about).....	400
	920
Grand total.....	3,599

In addition to these there are other lines contemplated, so that—not considering the projected Pacific road—it is likely that, in about two years time there will be at least 4,000 miles of railway in Canada in operation. Up to this time the railways of Canada have cost about \$165,000,000. The total receipts last year, of 15 of the principal lines, were about \$14,000,000.

2. CANADIAN PACIFIC RAILWAY.

The following interesting information concerning Mr. Waddington's proposed route for the Canadian Interocceanic Railway, and the character of the country it penetrates, is compiled from a lengthy report just published by that gentleman.

LENGTH OF THE PROPOSED ROUTE.

	Miles.
From Montreal to Ottawa	115
“ Ottawa to the Mattawan	195
“ the Mattawan to Fort Garry.....	985
“ Fort Garry to the Yellow Head Pass	985
Thence to the limit of British Columbia.....	52
Route by the Upper Fraser (British Columbia) by “short cut”	445
	2,467
Total length from Montreal to the Pacific	2,777

Against 3,305 miles from New York to San Francisco, or 228 miles less.

The distances given in the pamphlet are greater than these. In the first place, because no allowance was made for the proposed short cut in British Columbia, which, in all probability, can be realised; and secondly, because they were only roughly calculated and rather exaggerated.

CLASS OF LAND.

The above distances may also be classed in three categories, as regards the nature of the soil and the country traversed, viz.:-
 1. Level, rich, arable country; 2. Rolling country, less fertile; 3. Poor, mountainous, and timbered, in the following proportions—Valley of the Ottawa, 70 miles, rolling; Montreal Valley, 69 miles, level; Clay Level Country, 250 miles, level; Laurentides, north of Lake Superior, 20 miles, level; Neepigon and Black Sturgeon district, 41 miles, level; Height of Land to White Mouth River, 335 miles, poor; Great Western Plain, 1,012 miles, level; Great Western Plain, approach to Rocky Mountains, 25 miles, rolling; Valley of the Assiniboine, 39 miles, rolling; Rocky Mountains to the Cache, 80 miles, poor; Bald, or Gold Range beyond, 110 miles, poor; along Horsefly Lake and River, 20 miles, rolling; Chilcoaten Range (the valley itself fertile), 84 miles, poor; being a total of 1,544 miles of level country, 200 of rolling, and 723 of poor.

Recapitulation.—Rich and cultivable territory, 1,744 miles; grazing, timbered, and mountainous, 723 miles; total, 2,468.

EXTENSION TO VANCOUVER ISLAND.

Since writing the above pamphlet, it has been ascertained that by constructing suspension railroad bridges over the three straits between the mainland and Stuart Island, Stuart and Valdes Islands, and Valdes and Vancouver Islands, the railway can be eventually continued down the west side of Bute Inlet and across Vancouver Island, either to the head of Kyuquot Sound or to Alberni Canal, at the head of Barclay Sound; or to Esquimalt Harbour, near Victoria. By this means all the inconveniences of an intermediate terminus, and the expense, trouble, and delay of transshipment across the Gulf of Georgia, which, as compared with San Francisco, would render the road practically useless for commercial purposes, are avoided; and secondly (this is more important in an imperial point of view), a continuous and permanent communication with the mainland is established at a point offering the greatest strategical security, and which would be impregnable; thus dispensing with the absolute necessity of passing before the disputed

island of San Juan, and very much diminishing the importance of that vexed question. With such weighty motives to carry out the scheme, it becomes interesting to know what would be the probable outlay. The following approximate calculations show it to be enormous; such considerable undertaking must, therefore, necessarily be deferred, though it points to the advisability of carrying the road to Bute Inlet, apart from other weighty considerations.

Three lines are available, of which the following would be the estimated cost:—

To Tahsish Arm, Kyuquot Sound, 195 miles, £3,665,000; to Stamp Harbour, Alberni Canal, 164 miles, £3,298,750; to Esquimalt Harbour, Victoria, 248 miles, £3,940,750.

3. RAILWAYS AND TELEGRAPHS IN EUROPE AND AMERICA.

The progress of railway construction is among the most notable facts of modern times. A very short time ago there were scarcely any of those iron ways, now looked upon as a prime necessity in every country claiming to be at all civilized. Men not yet very old remember since there were none, and since the good old stage coach with its four smart horses was looked upon as the perfection of travelling appliance, at once for comfort and speed. All that is changed. To be far from a railway is now to be out of the world, and the novelty of thirty years ago is with us among the most ordinary of conveniences. In the old world and the new, railways are almost everywhere, and the most formidable natural obstacles are found to offer no hindrance to the progress of that which has done so much to bring the distant near the cheaper, and facilitate intercourse among all nations. Of course such a vast network of railroads as is now in operation, and the management of the prodigious commerce thus created would, to all appearance, have been impossible but for the corresponding extension of the electric telegraph, so that any notice of the progress of the one implies and necessitates a reference to the other.

At the close of last year the railways in the principal countries of Europe and America, including also those in British India, stood as follows:—

	Area Square miles.	Population.	Rail-roads in miles.	Railroads Cost.	Cost per mile.
United States.....	2,992,879	39,607,171	54,686	\$2,376,010,770	\$44,255
Russia in Europe.....	1,762,791	67,260,431	8,700	1,448,356,214	166,477
German Empire.....	266,511	38,514,846	10,018	1,099,711,322
Alsace and Lorraine.....		2,720,460
France.....	207,480	36,067,694	9,934	1,570,664,892	158,714
Austria.....	227,234	35,553,592	4,429	327,369,535	73,915
Great Britain and Ireland..	119,924	30,838,210	14,247	2,511,314,435	176,260
Italy.....	107,961	26,470,000	4,325	382,580,772	193,108
Spain.....	182,753	16,301,850	3,429	18,643,672	86,317
Turkey in Europe.....	207,438	16,500,000	319	367,437,924	107,156
Belgium.....	11,267	4,961,644	1,703	14,986,551	46,629
Sweden.....	168,042	4,095,681	1,194	74,539,082	62,437
Portugal.....	36,510	3,987,867	522	52,887,474	106,987
Netherlands.....	13,464	3,735,682	851	85,034,081	97,202
Switzerland.....	15,293	12,510,594	897	78,157,928	87,134
Denmark.....	14,553	1,738,565	401	22,902,714	57,114
Norway.....	120,729	1,701,628	114	4,055,656	92,170
Greece.....	19,941	1,332,508	160	5,000,000	50,000
British India.....	1,402,203	216,157,187	4,028	423,000,000	100,500
Canada.....	403,530	4,017,526	2,352	104,741,703	70,165

Let it be noted that in 1830 there were only 23 miles of railway in operation throughout the whole of the States, and not much more in Britain; that in 1840 there were only 2,818 in the same country; while so recently as 1850 there were no more than 9,021 miles in operation, where now there are 55,000 at least. During the whole time of the civil war in the neighbouring republic there were never less than a thousand miles of new railway opened every year, while nearly twenty thousand have been opened since the return of peace. In Great Britain there were only 1,630 miles open for traffic in 1842, and the next year saw it increased by only a hundred miles; in 1852, however, the amount had risen to 7,337; in 1862 to 11,470, and in 1870 to 14,610. The progress of the two countries in railways may be seen at a glance:—

	1849.	1870.
United States.....	7,365	54,686
Great Britain.....	5,950	14,610

It is to be noted also, that in India about 10,000 miles of railway are at present in course of construction, while so late as 1860 only 849 miles of railway were to be found in all that large country. In Canada a considerable amount of work is also being done in extending a network of the same indispensable means of traffic over our new and rising country. What the next ten years will see in the

way of railway extension it would be difficult to estimate. No doubt it will be quite as remarkable as in the past.

To complete this view of the means which modern science and enterprise have afforded for economizing time and all but annihilating distance, let us note the state of the telegraphic lines two or three years ago. Very great progress has been made since that time, but as these statistics are the latest yet collected, they may serve the purpose of comparison sufficiently well :

	Length of lines (Miles).	Length of wires (Miles).	Officials.
1868. United States.....	73,437	131,437	5,029
1869. N. Germany.....	14,980	49,725	2,028
1868. Baden.....	1,020	2,661	218
1868. Bavaria.....	2,475	7,524	427
1868. Wurtemberg.....	1,284	2,559	198
1869. Austria.....	9,955	32,243	477
1868. Belgium.....	2,549	7,970	410
1868. Denmark.....	1,183	2,899	53
1869. Spain.....	7,012	15,946	193
1869. France.....	26,440	72,864	2,625
1868. Great Britain.....	22,164	96,193	2,432
1867. Canada.....	7,000	9,337	434

When it is borne in mind that the telegraph did not come into practical use till 1844, when the first line was stretched between Washington and Baltimore, it is not going too far to say that the progress has been marvellous. We can scarcely imagine now how people got along at all without the railway and telegraph, and very likely our children will be equally astonished at the amount of contentment we have exhibited, and are still exhibiting, under what they will think a very scanty amount of comfort and accommodation compared with what they then will take as a matter of course, without which life would scarcely be tolerable. To have the latest news from Paris or Constantinople every morning supplied to the people of Toronto, a few hours after the facts have taken place, would once have been thought scarcely credible. Now it is so much a matter of course that even the most inveterate proser does not feel himself justified in venturing upon the remark that "certainly that Atlantic Cable is a very marvellous thing," though marvellous it may be called in all honesty and truth.

III. Papers on Scientific Subjects.

1. NEW TELEGRAPH INSTRUMENT.

Mr. Richard Herring, a well-known English mechanic, and author of many valuable scientific papers, has invented a new telegraphic instrument, the peculiarity of which appears to consist in its being furnished with two keys, one to work a lever carrying a pin to make a dot, and the other to work a lever carrying a small linear stile to make a dash. According to the *London Times*, greater accuracy seems likely to be secured by this device—an important realization, in view of the long time it takes to acquire the art of releasing or holding down the key with accuracy, and it will be much easier to use two keys, one for the dot and the other for the dash, and to use them with the same rapidity. Mr. Herring suggests that it would be practicable to emboss two slips at the same operation, and to give one to the sender, who would thus know with certainty what message had been despatched. The *Times* thinks that to save nearly half the time now consumed in telegraphing, to give a compressed and easily legible despatch in place of one that is always lengthy and often obscure, to make one ton of paper do the work of four tons, and to remove fertile sources of inaccuracy, are features of this invention of special merit. It is difficult to conceive, however, where paper is discarded, what advantage such an instrument can have over Morse's single key.

2. POWER OF A LOCOMOTIVE WHISTLE.

A locomotive whistle can be heard, under ordinary circumstances, 3,300 yards, or nearly two miles; the noise of a railway train, 2,800 yards; the bark of a dog or the report of a musket, 1,800 yards; the roll of a drum, 1,600 yards, and the human voice 1,000 yards. This is, of course, on the supposition that other sounds do not intervene and confuse the hearing.

3. AN INEXTINGUISHABLE SIGNAL LIGHT.

A new signal light, possessing most remarkable properties, has now been brought out in England. Its peculiarities are that it is self-igniting when placed in water or thrown on the sea. Contact with water being the only means of igniting the lamp, it is inextin-

guishable when once ignited; neither wind nor storm has any effect upon the flame. The light is of intense brilliancy and of great duration, and can be seen for a great distance in the open air. Photographs may be taken by it. Experiments were tried on the evening of the 25th April, at ten o'clock, in the presence of some scientific gentlemen, to determine its brilliancy as a signal. A lamp was placed in a bucket of water on the top of Primrose Hill, London, and the light was so intense that after the signal had been burning for twenty minutes, small newspaper print could be distinctly read at a distance of seventy feet, notwithstanding that the night was thick and foggy. This light will burn for forty minutes. In construction the lamp is exceedingly simple, and so contrived that when once burnt the whole may be thrown away. The chemical preparation contained in the lamp is a solid, hard substance, free from danger; not affected by heat, and is non-explosive; and the signal is comparatively inexpensive. Its applications for marine signals are numerous. In case of shipwreck, a few lamps, thrown on the sea, would illuminate the entire scene, and enable assistance to be promptly and efficiently rendered. For rocket-line apparatus it is equally valuable, as, bursting into a flame on falling into the sea, it would indicate the position of the rocket-line. In connection with life buoys, it would be a mark to the drowning sailor.

4. METRIC SYSTEM OF WEIGHTS AND MEASURES.

During the recent session, Hon. Mr. Morris introduced and carried through Parliament a Bill "to render permissive the use of the metric system of weights and measures." This Act was passed, so the preamble runs, "for the promotion and extension of the internal as well as the foreign trade of Canada, and for the advancement of science." It is now in force, and any one may, if he chooses, use the metric system in his business. The fourth clause of the Act provides that

"Whereas the Governor in Council is of opinion that it has become necessary and desirable, he may direct standards of metric weights and measures to be procured and legalized, and verified copies of them to be provided, and may by an Order in Council make regulations for authorizing and facilitating the use of the same for the verification of metric weights and measures in use in Canada."

This system has found much favour among scientific men, and has frequently been recommended by scientific bodies as the basis of a uniform international system. It was adopted in France in 1840, and all other systems declared illegal. In 1864, by Act of the Imperial Parliament, the use of the metric system was made permissive, and it is now, conjointly with the Imperial system, in use throughout the United Kingdom. Last year a royal commission was appointed on the subject. In their report the commissioners bear testimony to the utility of the system, and to the progress of public opinion in its favour, and recommend that the Government afford facilities for its more extensive use. They report that it is used exclusively in the following countries:—France; Belgium; Netherlands; Italy; Spain, and her colonies; Portugal, and her colonies; Greece; Mexico, Chili, Brazil, New Grenada, and the other South American republics. It has been partly adopted in Switzerland, Hanse Towns, Denmark, Austria, and British Indies; and its use is permissive in Great Britain and Ireland, the United States, and Prussia and North Germany. By a recent Act of the North German Parliament, its use will become compulsory in that country after the 1st of January next. In the session of 1870 a committee of our own Senate reported in its favour, and the result of their report is Mr. Morris' Act. A schedule gives tables of the values of the principal denominations of weights and measures on the metric system, expressed in terms of the standard weights and measures of Canada. Measures of length are expressed by *metres* and decimal multiples of a metre, one metre being 1.093944 yards; measures of surface by *ares* and decimal multiples of an are, one are being 100 square metres or 119.6714 square yards; weights by *grams* and decimal multiples of a gram, one gram being .002204 of a pound avoirdupois; and measures of capacity by *litres* and decimal multiples of a litre, one litre being .26428 of a wine gallon. The system is no doubt an excellent one from a scientific point of view, but the jaw-breaking words in which its denominations are expressed, will prevent its coming into popular use. People whose mother tongue is the Saxon do not take kindly to such words as *miriametre*, *millimetre*, *centiare*, *myriagram*, *kilolitre*, *hectolitre*, and the like. If Mr. Morris could translate these terms into plain English he might bring the system into general use; but we fancy it will be a long time before we hear of ladies calling at fashionable counters for a decametre of muslin or a centimetre of ribbon; of farmers selling pork at so much a hectogram; or of whisky being retailed by the decalitre.

IV. Biographical Sketches.

1. THE REV. DR. NEVILLE.

The Rev. Edmund Neville, D.D., Rector of St. Thomas' Church, was the son of the late General Neville, of the Royal Artillery, and was born in London, England, March 23rd, 1805. He entered the East India Company's Army as ensign in 1822. After serving five years he returned to England, and then emigrated to the United States. After some time he was ordained a Minister of the Episcopal Church of the United States, and held appointments at New Orleans, Philadelphia, Newark, N. J., and New York. About the commencement of the American war he returned to England, and soon afterwards came to Hamilton, holding the appointment of assistant minister of Christ's Church for about five years, and in 1868 was appointed rector of St. Thomas' Church. He was in his 67th year when he died.

2. REV. PROFESSOR HINCKS, F.L.S.

The deceased gentleman was born in the year 1792, and was consequently 79 years of age at the time of his death. His life was chiefly devoted to scientific pursuits, particularly in the department of Natural History. His contributions on Botany to the British Association and the Linnæan Society, and in later years to the *Canadian Journal*, on various branches of natural history, gave him a high reputation among scientific men of both hemispheres. On the establishment of a Chair of Natural History in Queen's College, Cork, he was appointed the first professor; and from 1854 until a short time before his death, he occupied a similar position in University College, Toronto. Dr. Hincks was a distinguished clergyman of the Unitarian Church, and though his studies chiefly took the direction of scientific subjects, theological questions received a share of his attention and called forth an occasional contribution from his pen. He came of a distinguished family. His father, the Rev. Dr. Hincks, of Belfast, was a celebrated oriental scholar; his brothers are all eminent men—Sir Francis Hincks, the Minister of Finance; Dr. Edward Hincks, the great cuneiform scholar; and Rev. Thomas Hincks, who was at one time proposed for the Kingston Bishopric.—*Globe*.

3. RECENT CANADIAN DEATHS.

DR. EDMUNDSON, of Brockville. His name has been a household word in the old Johnson District for more than thirty years past—his practice as a physician having extended far and wide. Dr. Edmundson was a most skilful physician and an accomplished scholar; he was a man of enlarged and liberal mind, and took the deepest interest in the progress and welfare of his adopted country. Though most retiring in his habits, his advice on important affairs, on many occasions during the last thirty years, was sought by successive leaders of the Liberal party, and found most valuable. Of the highest personal character, and beloved by all around him, a loss has resulted to Brockville and the country round, by the death of Dr. Edmundson, that cannot easily be supplied.

Mr. **JAMES STOCK** was born in the County of Lancashire, England, in the year 1818, and was a descendant of an old English Roman Catholic family. In the year 1830, Mr. Stock accompanied his father to this country, and settled in the township of Etobicoke, where the Stock family established what is still known as the "Stock Settlement." The first farm settled upon was the property of the late William Arthurs, of this city, and forms a portion of that tongue of land which may be seen jutting out into Lake Ontario, a short distance to the westward of Toronto. Subsequently Mr. Stock became a resident of Toronto, and entered into the business of distilling, which proved to be unprofitable, when he entered the store of Mr. Wm. Henderson to acquire a knowledge of the grocery trade, in which he remained until the time of his death, and in which he realized a very considerable competence.

Mr. **JOHN TAYLOR** was the oldest of the well-known firm of John Taylor & Brothers, Don Mills, millers and paper manufacturers. The father of the members of the firm, whose name was also John Taylor, emigrated from England in the year 1825, and settled with his family on the Don River, about three miles from the then town of York. As his family grew up, they manifested excellent business habits and great industry, and in their hands the property first acquired has increased to two thousand acres, and the water power on the stream is used to drive three paper-mills and a grist-mill. Mr. John Taylor was the eldest of the family, and to his liberality and enterprise was very largely due the great extension of the business of the firm. He was a man of the highest character. His probity, liberality and kindness, earned for him the respect and regard of all who knew him. He was

apparently a hale man, and might reasonably have looked forward to a long life. He has been cut off at the age of 62, by an acute inflammation, after a fortnight's illness.

Mrs. **ARCHANGE JONES**, widow of the late William Jones, Esq., for many years registrar of this county, and also Superintendent of Indian affairs for the Western District. Mrs. Jones, who was of French Roman Catholic descent, was born in the year 1787, on or near the present site of the Michigan Central Railway Depot in Detroit, where her father, M. Descout—*dit* Labadie—had a farm comprising 300 arpents of land, now forming the principal part of the city of Detroit. Previous to the breaking out of the war of 1812, Mrs. Jones was engaged to be married to her husband, who was at that time in the mercantile business in Detroit. When hostilities were commenced, he left his store property and valuables, to a large amount, and secreted himself in Mrs. Jones' father's house, till he got a Frenchman to paddle him over to the Canada shore, not, however, without several shots being fired at him by the Yankees, whilst crossing. He then took a command over the Indians and fought with Tecumseh at the battle of the Thames, as also at Lundy's Lane; he afterwards acted as aide-de-camp to General Proctor, during which time he married the subject of our memoir, in the township of Flamboro West, in the year 1815. Mrs. Jones was closely connected with most of the old French families of Detroit.

4. SIR JOHN HERSCHEL.

A cable despatch informs us of the death of the illustrious astronomer Herschel, who followed in the footsteps of his father, the great Sir F. W. Herschel. Sir John Frederick was in his 79th year at the time of his death, having been born in 1792. He graduated senior wrangler and Smith's prizeman at St. John's College, Cambridge, in 1813. He at once devoted himself to mathematical and astronomical pursuits, and took a high position among men of science. A list merely of his contributions—the result of patient and careful observations of the heavenly bodies—would take up considerable space. He remained four years at the Cape of Good Hope, studying the southern celestial hemisphere; and suggested the idea of making meteorological observations at different places simultaneously at an appointed time. He has received deserved and generous recognition from different scientific societies; received a baronetcy in 1838; and in 1842 was elected Lord Rector of Marischal College, Aberdeen, he having previously received a D.C.L. from Oxford.

5. SCHAMYL, THE CIRCASSIAN CHIEF.

Intelligence has been received of the decease of the great Circassian warrior Schamyl, at Medina, in the course of the pilgrimage to Mecca, to perform which he had obtained permission from the Russian Government. Schamyl was at the ripe old age of 73, having been born in 1797, in the village of Himry, in the north of Daghestan. He was a member of an obscure family, but was instructed by the Arab, Djelad Eddin, in the doctrines of Souphisana, according to which, in each century a man should appear who, by passing through the four degrees of religious perfection, should become a Mursheed, or an Elect of God, commanding other men in his name. To Schamyl, an acquaintance with this doctrine became a desire and a will to exemplify it in his own person, and he determined to become a Mursheed. In 1824 he joined the banner of Kasi-Mollah, then head of the Circassian tribes, who had declared a holy war against Russia, which was waged until 1831, to the advantage of the Circassians. In October of that year, however, the Russians brought overwhelming forces into the field, drove the tribes from position after position, and surrounded them in Himry, where Kasi-Mollah and his whole force were destroyed. Schamyl was supposed to have perished with them, and turned the idea to account by proclaiming his resurrection, which was extensively credited, although Hamfad Bey was chosen chief. Schamyl submitted without a murmur to the choice of the tribe; but some time afterwards Hamfad was murdered along with his guards or *Mureeds*, of whom Schamyl was one. He escaped, as if by miracle, for the second time, and now was considered as undoubtedly the Prophet and Sultan of the Caucasus, notwithstanding the schism of Pasha Hadji, who up to 1837 disputed with him the title of Mursheed. He afterward waged a successful contest against the power of Russia, and only succumbed to the forces of the Czar after years of heroic struggle.

6. CAPT. ALEXANDER MACNAB.

There seems to be a growing desire throughout Canada, now that Confederation has given us a country around which a national sentiment very naturally entwines itself, to preserve from oblivion such incidents as go to make up our country's history, and to col-

lect from witnesses, every day becoming fewer, such facts relative to the early settlers of these "backwoods" as may be of interest in after times. Dr. Canniff has done good service in this respect by writing a very graphic account of the early settlement of parts of Upper Canada, and the Rev. Dr. Scadding is doing for Toronto what Dr. Canniff did for the Bay of Quinte District. Though Canada is young, not a few of her sons have sought and won distinction in the service of the Empire. Those who have followed the red cross flag have proved themselves worthy scions of the old stock; all of us take a pride in noting their achievements and in recounting their deeds of daring. The name of Col. Dunn has recently been brought prominently before us in a very interesting biographical sketch. He received the Victoria Cross from our gracious Queen for acting the hero among heroes in the charge of the Light Brigade at Balaklava. Faithfully did he serve Old England, and right nobly did he sustain the honour of his native land. His career cut short so deplorably has a peculiar interest for Canadians, and, as we read of his brave deeds, an enthusiasm is stimulated by the knowledge that he was a Toronto boy. The public expressions of sorrow elicited by his untimely death prove that a "colonist" is not necessarily placed at a disadvantage in the mother land, and may win eulogies as glowing as those "native and to the manor born."

Other Canadians whose names are familiar to us all have distinguished themselves in various branches of the Imperial service; their courage and manly prowess have earned our acknowledgments and reflected credit on Canada. But it is not generally known that a native born Upper Canadian fought in the Peninsular War, and died on the field of Waterloo. We refer to Captain Alexander Macnab, of the 30th Regiment. His father was Dr. James Macnab, Surgeon to the Loyalist forces at the time of the American Revolutionary war, who received a grant of land for his services, and died in Lower Canada. The present representatives of this gentleman in the Dominion are the Reverend Dr. Alexander Macnab, Rector of Darlington, Ontario, and Alexander Macnab, Esq., C. E., now holding a responsible office under the Government of Nova Scotia. The father of this latter gentleman was Captain James Macnab, of Belleville, who was accidentally killed when on duty with the Volunteers in the Rebellion of 1837. This branch of the Macnab family emigrated from Scotland to America before the revolution, and during that sanguinary struggle passed over to Canada with many other "United Empire Loyalists," who preferred to abandon their lands in the revolted States, rather than forswear their allegiance to the British Crown.

The subject of this notice, Captain Alexander Macnab, was sworn in as Confidential Clerk to the Executive Council of the Province of Upper Canada on the 17th of January, 1797. At that time Peter Russell was administering the Government. Governor Simcoe was sworn in at Kingston on the 9th July, 1792, and Peter Russell on the 21st July, 1796, at York. The last named continued to serve as Administrator until the appointment of Peter Hunter, who was sworn in at York on the 17th August, 1799. There was but one Confidential Clerk before Captain Macnab. His name was Richard Barnes Tickell. The date of his appointment is 4th November, 1794. When Mr. Macnab entered upon his duties Newark (now Niagara) was the capital of the Province.

It may interest Rev. Dr. Scadding to learn that Mr. Macnab was the patentee of Lot No. 4 (one acre) on the corner of Wellington and Bay streets, Toronto, lately owned by Andrew Mercer, Esq. The patent issued the 25th Nov., 1802.

In February, 1800, Mr. Macnab was gazetted an Ensign in the Queen's Rangers; in 1803, he joined the 26th foot; in 1804, became Lieutenant in the 30th regiment, and in 1809, was promoted to a Captaincy. At the battle of Waterloo he was on the Staff, and served as aide-de-camp to the "Fighting-General" Sir Thomas Picton. The record at the War-office shows that he was "killed in action at Waterloo, 18th June, 1815," and was probably the only native of the Province of Upper Canada who took part in that greatest struggle of modern times.

When the Rev. Dr. Macnab was in England about two years ago, he was induced by his friends to submit a memorial to the War Department, praying that as the nephew and heir-at-law of Captain Macnab, he might be permitted to receive the Waterloo medal to which his late uncle's family was entitled. The application was submitted to Sir John Pakington, Secretary of State for the War Department, and by him referred to the Commander-in-Chief, His Royal Highness the Duke of Cambridge. An unappropriated Waterloo medal was therefore re-struck with the name of Captain Macnab, and transmitted to the applicant.

The granting of a medal after the lapse of such a length of time—over 50 years—is probably without precedent.

But the Home Authorities, not content with exhibiting a desire to meet the wishes of Captain Macnab's relatives in the matter of the medal, directed their attention to the allotment of his prize

money. The Chelsea Hospital Commissioners, composed of members of the Cabinet and veteran General Field Officers, found that a considerable amount of prize money was still lying to the credit of Captain Macnab's name. Although an Act had been passed many years ago cancelling all claims for prize money of the former time, and there existed no obligation to pay, yet an exception was made in this case, in favour of the nephew of the deceased officer, and the money paid over. The action, both as regards the medal and the prize money, indicates that a "colonist" may sometimes command advantages with the Imperial Authorities that would be denied to one who still cultivated the paternal acres in England, and that Canada is esteemed in the highest quarters at home, very much more than some writers would have us believe.—*Com. to Church Herald.*

V. Miscellaneous.

1. ONTARIO EDUCATIONAL ITEMS.

UNIVERSITY COLLEGE.—The chair of Natural History and Botany in University College, rendered vacant by the decease of the late Professor Hincks, has been filled by the appointment of Mr. Allyn Nicholson, M.D., D.S., M.A., Ph.D.C., hitherto lecturer on Natural History, embracing the studies of living and extinct animals, in the Medical School of Edinburgh.

MCGILL UNIVERSITY, MONTREAL.—The Board of Governors of McGill University have elected to the office of Professor of Civil Engineering in the new Department of Practical Science, Mr. George Frederick Armstrong, M.A., (Cantab), C.E., F.G.S., member of the Society of Arts and Associate of the Institute of Civil Engineers. The Board has also secured the services of Mr. Bernard J. Harrington, B.A., of McGill College, and Ph.D., of Yale, Lecturer on Assaying and Mining.

TOWN OF WOODSTOCK.—The trustees of the Woodstock High School are bestirring themselves to materially improve that institution. An effort is to be made to erect a new building; but, if that be found impracticable, it is proposed to render the existing structure more comfortable, roomy and commodious, and, in various ways, to improve and popularize it.

COUNTY OF LAMBTON.—A circular has been issued by the Inspector of Schools for the Eastern Division of Lambton, calling a meeting of the teachers of the Townships of Warwick and Brooke, at Watford school house, on Friday, Oct. 6th, at 10 a.m. Subjects for discussion: 1. The method of classification adopted and recommended by the Board of Public Instruction. 2. The best means of interesting parents and guardians in the daily work of the teachers. 3. What should be observed, and what avoided, in the management of a class during recitation. It is hoped there will be a general attendance of all the teachers in these townships, both male and female, and that they will come prepared to make the meeting interesting and profitable. A conversazione will be held in the evening, at which addresses will be delivered.

COUNTY OF WELLINGTON.—We learn from the *Mercury* that a meeting of the Board of Examiners for the County of Wellington, was held in Guelph on Saturday last, at which the following resolution was carried: Moved by Mr. W. G. Kidd, seconded by Mr. A. D. Fordyce, "That as a resolution was passed by this Board at its last meeting, by which all certificates granted previous to the year 1867 by the late Circuit Boards for this county, and now valid therein, were declared to be so only to the end of the present year; and as it now appears from a communication received from the Chief Superintendent of Education, that said resolution, although legal, has been premature, the Board resolves that it shall not be acted on, and directs notifications of the same to be given to the teachers affected thereby." After the transaction of some other business, the Board adjourned, to meet on the 30th inst.

CITY OF TORONTO.—The consent of the ratepayers of the City of Toronto has been obtained authorizing the issue, by the City Council, of debentures to the value of \$52,500 for the purchase of sites and the erection of additional school houses.

HIGHER EDUCATION FOR LADIES.—In Toronto, Dr. Wilson, Prof. Cherriman and Mr. Goldwin Smith continue the labours which have proved so acceptable in past years; and the new professor of University College, Dr. Nicholson, having already lectured to classes of ladies in Edinburgh, finds no difficulty in supplying a course upon natural science.

In Montreal, the members of the Ladies' Educational Association, formed in the spring, have been supplied with a descriptive programme of three of the four courses of lectures which have been arranged for this winter. The object of this Association is to afford to the ladies of Montreal an opportunity of obtaining a higher education than has hitherto been within their reach.

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

I. ABSTRACT OF MONTHLY METEOROLOGICAL RESULTS, compiled from the Returns of the daily observations at ten High School Stations, for July, 1871.

OBSERVERS:—Pembroke—James Smith, Esq., M.A.; Cornwall—James H. Coyne, Esq., B.A.; Barrie—H. B. Spotton, Esq., M.A.; Peterborough—Ivan O'Beirne, Esq.; Belleville—A. Burdon, Esq.; Goderich—James Preston, Esq., B.A.; Stratford—C. J. Macgregor, Esq., M.A.; Hamilton—A. Macallum, Esq., M.A.; Simcoe—James J. Wadsworth, Esq., M.A.; Windsor—J. Johnston, Esq., B.A.

Table with columns: STATION, BAROMETER AT TEMPERATURE OF 32° FAHRENHEIT, TEMPERATURE OF THE AIR, and TENSION OF VAPOUR. Rows include Pembroke, Cornwall, Barrie, Peterborough, Belleville, Goderich, Stratford, Hamilton, Simcoe, and Windsor.

Approximation. d On Lake Simcoe e Near Lake Ontario on Bay of Quinte. f On St. Lawrence. g On Lake Huron. h On Lake Ontario. i On the Ottawa River. l Close to Lake Erie. m On the Detroit River. n Inland Towns.

Table with columns: STATION, HUMIDITY OF AIR, WINDS, NUMBER OF OBSERVATIONS, ESTIMATED VELOCITY OF WIND, AMOUNT OF CLOUDINESS, RAIN, SNOW, and AURORAS. Rows include Pembroke, Cornwall, Barrie, Peterborough, Belleville, Goderich, Stratford, Hamilton, Simcoe, and Windsor.

a Where the clouds have contrary motions, the higher current is entered here. Velocity is estimated, 9 denoting calm or light air; 10 denoting very heavy hurricane.

REMARKS.

Pembroke.—On 1st, solar halo. 13th, lightning, with thunder. 14th, thunder, with rain. 16th, 17th, 18th, 27th, 30th, lightning and thunder, with rain. Wind storm on 2nd. Fogs, 15th, 25th. Rain, 1st, 5th, 6th, 7th, 9th, 12th, 14th, 17th, 18th, 19th, 22nd, 23rd, 27th, 29th, 31st. Month unusually cold, mean temperature being 7° below the average for July during the last six years. Crop of hay average, other crops better than usual. CORNWALL.—On 17th, 31st, thunder, with rain. Rain on 4th, 6th, 12th, 17th—20th, 22nd, 26th, 31st. BARRE.—On 7th, high wind. 21st, a beautiful bend of auroral light was seen, stretching across the sky from S.E. to N.W., a very little S. of zenith, slightly waving with motion westward, in the direction of its length. Rain, 4th, 5th, 6th, 10th, 17th, 18th, 21st, 27th, 30th. Month unusually dry. PETERBOROUGH.—On 4th, 6th, 18th, lightning and thunder, with rain. 16th, lightning. 12th, at 10.30 P.M., a sudden

bright flash (noiseless) overhead, which illuminated the air, supposed to be from a meteor. 21st, slight hoar frost; cold during day; strong auroral light; at 10.18 P.M., a pencil of bright auroral light stretching across from W part of H to within 30° S of E part of H for about 14 minutes. 22nd, quite cold, 24th, 25th, slight hoar frost. Rain, 4th, 5th, 6th, 18th, 22nd, 27th.

BELLEVILLE.—On 6th, 9th, 18th, lightning and thunder, with rain. 21st, thunder, with rain. Wind storms on 4th, 7th, 13th, 14th, 20th. Rain, 4th, 6th, 9th, 18th, 21st, 22nd, 27th.

GODERICH.—On 6th, rainbow at 7.30 P.M. 8th, 9th, thunder. 13th, lightning, with thunder; three atmospheric currents in evening S, N, NW. 15th, lightning and thunder, with rain. 20th, hail. Wind storms on 1st, 3rd, 13th, 18th, 19th, 26th. Fog, 4th. Rain, 4th, 6th, 8th, 9th, 10th, 15th, 19th, 20th, 26th, 27th.

STRATFORD.—On 9th, thunder. 6th, 11th, 16th, 27th, lightning. 15th, 26th, lightning and thunder, with rain. 20th, lightning, with rain. Wind storms, 15th, 18th, 26th. Rain, 4th, 6th, 8th, 10th, 11th, 15th, 18th, 20th, 26th, 27th. Excess of mean temperature over average of 10 years, 0.°48.

HAMILTON.—On 4th and 14th, storms of lightning, thunder and rain. 13th and 18th, thunder, with rain. Rain on 4th, 6th, 14th, 16th, 18th, 21st, 27th. Month remarkably dry; calmness has also been a characteristic.

SIMCOE.—On 4th and 27th, lightning and thunder, with rain. Wind storms, 17th, 18th. Rain, 4th, 7th, 9th, 16th, 18th, 19th, 27th.

WINDSOR.—On 3rd, 8th, 14th, 26th, lightning and thunder, with rain. 6th, 15th, 26th, lightning. 30th, thunder, with rain. 1st, 25th, 27th, lunar halo. 11th, meteor in NW, towards H, and another towards W. Wind storms, 1st, 6th, 8th, 9th, 27th. Rain, 3rd, 6th, 8th, 11th, 14th, 19th, 26th, 30th.

VII. Departmental Notices.

LIST OF AUTHORIZED TEXT BOOKS FOR THE HIGH SCHOOLS IN ONTARIO.

(Sanctioned by the Council of Public Instruction.)

NOTE.—In the following list some books are *prescribed* under the authority of the fifteenth section of the Consolidated High School Act, and others are *recommended*. The use of the books *recommended* is discretionary with the respective High School Boards. The Council has decided that the books on English subjects authorized for High Schools may also be used in the Public Schools.

I. LATIN.

TEXT BOOKS PRESCRIBED :

Harkness's New Series, viz :

1. An Introductory Latin Book. By Albert Harkness, Ph. D.
2. A Latin Reader, intended as a Companion to the Author's Latin Grammar. By Albert Harkness, Ph. D.
3. A Latin Grammar for Schools and Colleges. By Albert Harkness, Ph. D.

If preferred, the following may be used instead of the above series :

Arnold's First and Second Latin Books and Practical Grammar, revised and corrected. By J. A. Spencer, D.D., or, Dr. Smith's Principia Latina. Part I. Revised by H. Drisler, LL. D.

A Smaller Grammar of the Latin Language. By William Smith, LL.D.

LATIN DICTIONARY RECOMMENDED : (See note above.)

A Latin-English and English-Latin Dictionary. By Charles Anthon, LL.D., or,

The Young Scholar's Latin-English and English-Latin Dictionary. By Joseph Esmond Riddle, M.A.

II. GREEK.

TEXT BOOKS PRESCRIBED :

A First Greek Book, comprising an outline of Grammar and an Introductory Reader. By Albert Harkness, Ph. D., or, Dr. Smith's *Initia Græca*.

A smaller Grammar of the Greek Language, abridged from the larger Grammar of Dr. George Curtius.

GREEK LEXICON RECOMMENDED : (See note above.)

Liddell and Scott's Greek-English Lexicon.

III. ANCIENT HISTORY, CLASSICAL GEOGRAPHY, AND ANTIQUITIES.

TEXT BOOKS PRESCRIBED :

A Manual of Ancient History. By Dr. Leonhard Schmitz.

First Steps in Classical Geography. By Prof. James Pillans.

CLASSICAL DICTIONARIES, &C., RECOMMENDED : (See note above.)

A Classical Dictionary of Biography, Mythology and Geography. By Wm. Smith, LL.D.

A Dictionary of Greek and Roman Antiquities. By Wm. Smith, LL.D., or,

A Classical Dictionary. By Charles Anthon, LL.D.

A Manual of Roman Antiquities. By Charles Anthon, LL.D.

A Manual of Greek Antiquities. By Charles Anthon, LL.D.

IV. FRENCH AND GERMAN.

TEXT BOOKS PRESCRIBED :

Text Books in French and German will be prescribed.

History of Charles XII. of Sweden. By Voltaire.

Horace : A Tragedy. By Corneille.

A Complete Dictionary of the French and English Languages. By Gabriel Surenne. Spiers' New Abridged Edition.

V. ENGLISH.

TEXT BOOKS PRESCRIBED :

The Canadian National Series of Reading Books. (Authorized edition.)

The Spelling Book, A Companion to the Readers. (Authorized edition.)

Miller's Analytical and Practical English Grammar. (Authorized edition.)

A History of English Literature, in a Series of Biographical Sketches. By William Francis Collier, LL.D.

VI. ARITHMETIC AND MATHEMATICS.

TEXT BOOKS PRESCRIBED :

Advanced Arithmetic for Canadian Schools. By Barnard Smith, M. A., and Archibald McMurchy, M. A.

Elementary Arithmetic for Canadian Schools. By the Rev. Barnard Smith, M.A., and Archibald McMurchy, M.A.

Elements of Algebra. Todhunter's or Sangster's.

Euclid's Elements of Geometry. Potts' or Todhunter's.

VII. MODERN GEOGRAPHY AND HISTORY.

TEXT BOOKS PRESCRIBED :

Lovell's General Geography. (Authorized edition.) By J. George Hodgins, LL.D., Barrister-at-Law.

A School History of the British Empire. By William Francis Collier, LL.D.

A History of Canada, and of the other British Provinces or North America. By J. George Hodgins, LL.D., Barrister at Law.

Outlines of General History. By William Francis Collier, LL.D.

TEXT BOOK RECOMMENDED :

The Great Events of History. By William Francis Collier, LL.D.

VIII. PHYSICAL SCIENCE.

TEXT BOOKS PRESCRIBED : (See note above.)

Rudimentary Mechanics, by Charles Tomlinson, with Cassell's Hand-Book of Natural and Experimental Philosophy, or,

Manual of Mechanics, by the Rev. Samuel Haughton, M. A. F.R.S., with Introductory Course of Natural Philosophy. Edited from Ganot's Popular Physics, by W. G. Peck, M.A.

The Animal Kingdom, by Ellis A. Davidson.

How Plants Grow; A Simple Introduction to Botany, with Popular Flora. By Asa Gray, M.D.

Lessons in Elementary Chemistry. By Henry E. Roscoe, B.A., L.R.S.

IX. MISCELLANEOUS.

TEXT BOOKS PRESCRIBED :

First Lessons in Agriculture, by Rev. Dr. Ryerson.

First Book on Anatomy, Physiology and Hygiene, for Private Schools and Families, by Calvin Cutter, M. D., *or* (for Public Schools)* Our Bodies, by Ellis A. Donaldson.*

Easy Lessons on Reasoning, by Archbishop Whately.

TEXT BOOKS RECOMMENDED : (See note above.)

A Comprehensive System of Book-keeping, by Single and Double Entry. By Thomas R. Johnson. A work on Book-keeping is to be sanctioned.

Field Exercise and Evolutions of Infantry. Published by Authority. Pocket edition (for Squad and Company Drill.)

The Modern Gymnast. By Charles Spencer.

A Manual of Vocal Music. By John Hullah.

Three-Part Songs. By H. F. Sefton. (Authorized edition.) National Mensuration.

Scripture Lessons—Old and New Testaments. (National.)

Lessons on the Truth of Christianity. (National.)

Right Lines in their Right Places, by Ellis A. Davidson.

Linear Drawing, by Ellis A. Davidson.

Teacher's Guide, and Bartholemew's Primary School Drawing Cards, by Miss J. H. Stickney.

The Drawing Book for the Dominion of Canada, in progressive Studies, seven numbers.

William Hermes' Drawing Instructor. For advanced students.

Writing Copy Books, used in the Normal and Model Schools for Ontario. In Five Parts.

LIST OF AUTHORIZED TEXT BOOKS FOR USE IN THE PUBLIC SCHOOLS OF ONTARIO.

(Sanctioned by the Council of Public Instruction.)

NOTE.—In the following list, some books are *prescribed*, and others are *recommended*. The use of the books *recommended* is discretionary with the respective Public School Boards.

I. ENGLISH.

TEXT BOOKS PRESCRIBED :

The Canadian National Series of Reading Books. (Authorized edition.)

The Spelling Book, A Companion to the Readers. (Authorized edition.)

Miller's Analytical and Practical English Grammar. (Authorized edition.)

An English Grammar for Junior Classes. By the Rev. H. W. Davies, D.D. (Authorized edition.)

A History of English Literature, in a series of Biographical Sketches. By William Francis Collier, LL.D.

II. ARITHMETIC AND MATHEMATICS.

TEXT BOOKS PRESCRIBED :

Advanced Arithmetic for Canadian Schools. By Barnard Smith, M.A., and Archibald McMurchy, M.A.

Elementary Arithmetic for Canadian Schools. By the Rev. Barnard Smith, M.A., and Archibald McMurchy, M.A.

Elements of Algebra. Todhunter's or Sangster's.

Euclid's Elements of Geometry. Potts' or Todhunter's.

III. GEOGRAPHY AND HISTORY.

TEXT BOOKS PRESCRIBED :

Lovell's General Geography. (Authorized edition.) By J. George Hodgins, LL.D., Barrister-at-law.

Easy Lessons in General Geography. By ditto. (Authorized edition.)

A School History of the British Empire. By William Francis Collier, LL.D.

A History of Canada and of the other British Provinces of North America. By J. George Hodgins, LL.D., Barrister-at-law.

Outlines of General History. By William Francis Collier, LL.D.

TEXT BOOK RECOMMENDED :

The Great Events of History. By William Francis Collier, LL.D.

IV. PHYSICAL SCIENCE.

TEXT BOOKS PRESCRIBED : (See note above.)

Rudimentary Mechanics, by Charles Tomlinson. Portions relative to the mechanical powers.

The Animal Kingdom, by Ellis A. Davidson.

How Plants Grow; A Simple Introduction to Botany, with Popular Flora. By Asa Gray, M.D.

V. MISCELLANEOUS-

TEXT BOOKS PRESCRIBED :

First Lessons in Agriculture, by Rev. Dr. Ryerson.

Our Bodies*, by Ellis A. Davidson.

Easy Lessons on Reasoning, by Archbishop Whately.

TEXT BOOKS RECOMMENDED : (See note above.)

A Comprehensive System of Book-keeping, by Single and Double Entry. By Thomas R. Johnson. A work on Book-keeping is to be sanctioned.

Field Exercise and Evolutions of Infantry. Published by Authority. Pocket edition (for Squad and Company Drill.)

The Modern Gymnast. By Charles Spencer.

A Manual of Vocal Music. By John Hullah.

Three-Part Songs. By H. F. Sefton. (Authorized edition.) National Mensuration.

Scripture Lessons—Old and New Testaments. (National.)

Lessons on the Truth of Christianity. (National.)

Right Lines in their Right Places, by Ellis A. Davidson.

Teacher's Guide, and Bartholemew's Primary School Drawing Cards, by Miss J. H. Stickney.

The Drawing Book for the Dominion of Canada, in progressive Studies, seven numbers.

William Hermes' Drawing Instructor. For advanced students.

Writing Copy Books, used in the Normal and Model Schools for Ontario. In Five Parts.

VI. FRENCH AND GERMAN SCHOOLS.

The following books, approved by the whole Committee of the Council of Public Instruction for Quebec, are also sanctioned for use by French pupils, in Public Schools of this Province in which there are both Protestant and Roman Catholic pupils :

Cours d'Arithmétique Commerciale. (Senécal, Montreal.)

*The following little works are also highly recommended for perusal, both by Teachers and Pupils, viz.—“The House I live in,” by T. C. Girtin, Surgeon (Longmans), and “Our Earthly House and its Builder.” (Religious Tract Society.) “Our Bodies,” by Ellis A. Davidson, is the prescribed book for Public Schools, and may be used in the High Schools if desired.

*The following little works are also highly recommended for perusal, both by Teachers and Pupils, viz.—“The House I live in,” by T. C. Girtin, Surgeon (Longmans), and “Our Earthly House and its Builder.” (Religious Tract Society.) Cutter's “First Book on Anatomy, Physiology and Hygiene, for Grammar Schools and Families,” is the prescribed book for High Schools, and may be used in the Public Schools if desired.

Abrégé de la Géographie Moderne. (Société d'Éducation de Québec.)

La Géographie Moderne, de M. Holmes, M.A.

Grammaire pratique de la langue Anglaise. (Par P. Saddyler, Paris.)

Traité Élémentaire d'Arithmétique. (Par F. X. Toussaint.)

Le Premier Livre de l'Enfance. (de Poitevin.)

Cours de Versions Anglaises. (Par P. Saddyler, Paris.)

Grammaire Française Élémentaire. (Par F. P. B.)

For German Schools, Klotz's German Grammar is sanctioned.

AUTHORIZED TEXT BOOKS.

The lists of the authorized Text Books for High and Public Schools, so far as completed by the Council of Public Instruction, is published above. Inspectors, Trustees and Teachers will please see that these books are used in the schools.

SCHOOL PREMISES AND ACCOMMODATION.

We would call the attention of the Inspectors to Note to a of Regulation No. 4 of their "Duties," in which they are directed to call the attention of Trustees to the condition of the School premises. In many School sections the School-house has been allowed to remain in the same state for fifteen or twenty years and longer, often on a bare open space, or on the road-side unenclosed, without a tree or shrub near by to shade it, or any provision being made by the Trustees for the convenience or health of the pupils, or even for their observance of the decencies of life. The Legislature has wisely decided that this state of things shall not continue, but that, as soon as possible, a remedy shall be applied, where necessary. A reasonable time should of course be allowed to Trustees in all cases to set things right; but in the meantime Inspectors will, we trust, not fail to urge upon Trustees the necessity of complying, as soon as possible, with the provisions of the law and Regulations on this subject.

SCHOOL HOUSE ARCHITECTURE.

In the *Journal of Education* for February, 1870, Trustees will find a variety of illustrations on School House Architecture, with letter-press descriptions. Extra copies of this journal will be sent free by post, on receipt of 12 cents. There has also been published a useful pamphlet on "The School House, its Architecture," etc., with numerous illustrations, which can also be sent free by post on receipt of 65 cents.

NEW SCHOOL REGISTERS.

In reply to numerous applications for Public School Registers, &c., we desire to say that the new edition (including the modifications in the courses of study required by the new School Act) has been sent out to the County Clerks for distribution through the Inspectors. No copies will be sent out direct to individual schools from the Education Department. Trustees will, therefore, please apply to the Inspector for them.

NO PENSIONS TO PUBLIC SCHOOL TEACHERS UNLESS THEY SUBSCRIBE TO THE FUND.

Public notice is hereby given to all Teachers of Public Schools, or Teachers of the English branches in High Schools, who are legally qualified Public School Teachers in Ontario, who may wish to avail themselves at any future time of the advantages of the Superannuated Teachers' Fund, that it will be necessary for them to transmit to the Chief Superintendent or Inspector, if they have not already done so, their subscriptions, at the rate of \$5 per annum for each preceding year, commencing with 1854, and at the rate of \$4 per annum for the current year's subscription. The law authorizing the establishment of this fund provides, "That no teacher shall be entitled to share in the said fund who shall not contribute to such

fund at least at the rate of four dollars per annum." No pension will be granted to any teacher who has not subscribed to the fund, in accordance to the preceding regulations of the Council of Public Instruction; nor can one be granted for any year of teaching for which the subscription has not been paid.

THE CONSOLIDATED SCHOOL ACT,

Embracing the School Acts of 1850, 1860 and 1871, was published in this *Journal* for May and June. These Journals were mailed to each School Trustee Corporation and Inspector in Ontario. Extra copies will be sent from the Depository free of postage, on receipt of twenty-five cents.

THE NEW PROGRAMME AND LIMIT TABLE

Were published in this *Journal* for July, and mailed to each Trustee Corporation and Inspector. Extra copies will be sent for 12½ cents, free of postage. The two can also, if preferred, be furnished on large sheets for hanging up in the school room at the same price. The proportion has also, for greater convenience and certainty, been printed on the last page of the cover of the Register.

EXAMINATION PAPERS IN SETS.

The entire set of Examination Papers for First, Second, and Third Class Teachers, neatly stitched, can be sent free of postage, on receipt of sixty cents. Those used in the Normal School during the last and previous Sessions, or those used at the County Examination for Second and Third Class Teachers, can also be sent, neatly bound, free of postage, on receipt of fifty cents.

PROFESSIONAL BOOKS SUPPLIED TO INSPECTORS AND TEACHERS.

Text-books must be paid for at the full catalogue price. Colleges and private schools will be supplied with any of the articles mentioned in the catalogue at the prices stated. Local Superintendents and teachers will also be supplied, on the same terms, with such educational works as relate to the duties of their profession.

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VIII. Advertisement.

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SHORT ADVERTISEMENTS inserted in the *Journal of Education* for 20 cents per line, which may be remitted in postage stamps or otherwise.

TERMS: For a single copy of the *Journal of Education*, \$1 12 per annum. Back vols., neatly stitched, supplied on the same terms. All subscriptions to commence with the January Number, and payment in advance must in all cases accompany the order. Single numbers, 12½ cents each.

All communication: to be addressed to the Editor, J. GEORGE HODGINS, LL.D., Education Office, Toronto.