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THE

EDUCATIONAL RECORD

OF THE

PROVINCE OF QUEBEC,

PUBLISHED MONTHLY, UNDER THE AUTHORITY OF THE PROTESTANT COMMITTEE OF THE BOARD OF EDUCATION, AND CONTAINING THE OFFICIAL ANNOUNCEMENTS OF THE BOARD.

EDITED BY R. W. BOODLE.

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THE

EDUCATIONAL RECORD

OF THE

PROVINCE OF QUEBEC.

No. 12. DECEMBER, 1882. VOL. II.

EXAMINATION PAPERS.

SET TO ACADEMIES AND NORMAL SCHOOLS, 1882.

(N.B. In most of the papers only four questions might be answered.)

Latin.

1. Write the dative, singular and plural, of some noun in each of the five declensions. (10)

2. Decline the singular of *bonus* and *melior*, and the plural of *tristis* and *niger*. (10)

3. Decline together *unus homo*, and in plural *idem bellum*. (10)

4. Give the positive, comparative, and superlative of the Latin words signifying *difficult, much, old, bad, hard*. Also the comparative and superlative of *prae, intra, prope*. (10)

5. What are the different classes of pronouns? Mention some of each class. Write out with meanings all you remember that are formed from *qui* or *quis*. (15)

6. Write—with meanings—the present and perfect of *sum* in all the moods. (10)

7. Write out with meanings all the tenses of *rego* in which the auxiliary verb is used,—giving only 1st. per. sing. in indicative and subjunctive. (15)

8. Write out the principal (or characteristic) parts of *do, sto, jubeo, video, capio, facio, vivo, scribo, tollo, scindo, mitto, vinco, vincio*. (20)

9 Give the prepositions governing the ablative alone, with meanings. Which of them are also used as adverbs? (15)

10. Give the Latin of *where, thence, hither, elsewhere, never, to-day, now, not yet often, enough*. (20)

11. In what respects does a verb agree with its nominative, an adjective with its substantive, and a relative with its antecedent? Give an example of each. (15)

12. Give an example of the accusative and infinitive. How would you translate it into English? After what verbs is this construction used? (20)

13. Translate into Latin:—"Virtue is dearer to me than glory."

"Our parents, to whom we owe so many good things, should be honoured in the highest degree." "On account of their virtue we often love men whom we have never seen." (20)

14. Translate into English:—

"Fit protinus, hac re auditâ, ex castris Gallorum fuga. De mediâ nocte missus equitatus, novissimum agmen consequitur: magnus numerus capitur atque interficitur; reliqui ex fugâ in civitates discedunt."

Or this:—

"Quis esset tantus fructus in prosperis rebus, nisi haberes qui illis aeque ac tu ipse gauderet? adversas vero ferre difficile esset, sine eo qui illas gravius etiam quam tu referret." (25)

Greek.

1. Decline *πόλις* (in singular), *σῶμα* (in dual), *νεώς* a temple (in plural), *ναῦς* (throughout), *νεανίας* (in sing.), mentioning declension and class to which each belongs. (10)

2. Decline *ἀγαθός* (in sing.), *ἡδύς* (in dual), *πολύς* (in sing.), *τυφάς* (in plur.) Give comparative and superlative of the three former. (10)

3. Give nom. and gen. sing. of *ὅδε* and *οὗτος*, in all the genders. What is the English of *οὗτος ὁ ἀνήρ, αὐτὸς ὁ ἀνήρ, ὁ αὐτὸς ἀνήρ*? (15)

4. Write the short paradigm of the perfect active of any verb, and the same of the 1st aorist passive. (20)

5. Write (with name of tense and meaning) the 1st per. sing. of all the tenses of indicative passive of *τύπτω*. (20)

6. Write the different tenses of the infinitive active of any verb; and the participles in the different tenses passive of any verb. (20)

7. What are the different classes of contracted verbs?

Take any one of them and write the 1st and 2nd per. sing. of all the contracted tenses active, besides the infin. mood and participle. (25)

8. Give the principal parts of *γιγνώσκω, λαμβάνω, ἔχω, εὑρίσκω, βαίνω, βάλλω, γίγνομαι.* (25)

9. What cases are governed by the following prepositions:—*ἀπό, διά, εἰς, ἐκ, ἐν, ἐπί, κατά, παρά*? and with what principal meanings? (25)

Algebra.

1. To $3bc - 6d + 2b - 3y$, add $-3bc + 2d + b - c$; and from $5ay + 2x - 7a$ subtract $3xy - x + 2a$. (10)

2. Multiply $x^3 + x^2y + xy^2 + y^3$ by $x - y$; and divide $12a^2x + 4ax^2 - 16a$ by $4a$. (10)

3. Divide $x^4 - 9x^2 - 6xy - y^2$ by $x^2 + 3x + y$. (15)

4. Reduce to a whole or mixed quantity $\frac{4x^2 + ax - 2}{2x}$.

And multiply $\frac{(3a^2 - x^2) + a - x}{2}$ by $\frac{4}{3(a - x)}$ (20)

5. Solve $\frac{3x+4}{5} - \frac{7x-3}{2} = \frac{x-16}{4}$ (15)

6. Find the number, one-third of which, added to one-fourth, shall be equal to the number itself diminished by ten. (25)

7. Solve $\left\{\begin{array}{l} 2x+4y-3z=22 \\ 4x-2y+5z=18 \\ 6x+7y-z=63 \end{array}\right\}$ (25)

8. Give a quadratic equation, and show the difference between pure and affected quadratic equations. Write down the rule for solving each. (25)

9. There is a number consisting of 2 digits, which is equal to four times the sum of those digits; and if 9 be subtracted from twice the number, the digits will be inverted. What is the number. (25)

10. Find 2 numbers, the first of which is to the second as the second is to 16; and the sum of the squares equal to 225. (25)

Arithmetic.

1. Add together $\frac{2}{5}$, $\frac{4}{9}$, $\frac{3}{10}$, and $\frac{7}{18}$, and divide the result by $7\frac{5}{8}$. (10)

2. Reduce to their lowest terms $\frac{23205}{46436}$, and $\frac{25025}{35035}$. (10)

3. Simplify $\frac{3\frac{1}{16}-1\frac{5}{12}}{16\frac{2}{3}\text{ of }2\frac{7}{10}}$, and subtract $\frac{5}{12}$ from $\frac{7}{8}$. (15)

4. Divide 69.814 by ·00521, and by 52100. (15)

5. Find the square root of ·0069$\dot{4}$. Of what number is ·2 the square root? (20)

6. Find the simple interest on \$6250 for $7\frac{1}{2}$ years at $3\frac{1}{4}$ per cent. (20)

7. If 21 men take 8 days to dig 20 acres, how many acres will 16 men dig in 12 days? (20)

8. Explain the difference between interest and discount, and find the true present worth of £2,674. 6s. due 3 years hence at $4\frac{3}{5}$ per cent. (25)

9. The rate of a clock is ·075 per cent. too fast. How much will it gain in a week? (25)

10. I have 2 square lots of land, the larger of which contains 270 acres; the ratio of the smaller to the larger is as 5 to 6. What is the length of one side o the smaller? (25)

11. Three persons formed a partnership. A put in \$170 dollars for 9 months, B \$130 for 12 months, and C \$150 for 8 months. They gained \$286. What was the share of each? (25)

Geometry.

1. Define a square and a semi-circle, also parallel straight lines; and write out the first and third postulates. (10)

2. Define a rhomboid, a gnomon, the angle of a segment, reciprocal figures. (3+5+7+10). (25)

3. The angles which one straight line makes with another upon one side of it are either two right angles, or are together equal to two right angles.

4. Describe a parallelogram that shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle?

5. Divide a given straight line into two parts, so that the rectangle contained by the whole and one of the parts shall be equal to the square on the other part. (15) Or solved algebraically. (25)

6. Draw a straight line from a given point, either without or in the circumference, which shall touch a given circle. (15)

7. Define the manner in which a figure is said to be described about another figure. Describe a circle about a given equilateral and equiangular pentagon. (25)

8. Similar triangles are to one another in the duplicate ratio of their homologous sides. (25)

English Grammar.

1. Classify the letters of the alphabet according to their different powers. (10)

2. Define an *Abstract Noun*, and give examples of different kinds of Abstract Nouns. To what classes of Nouns belong the words—*Army, Courage, Soldier, Cæsar, Glory, April, Month?* (15)

3. Give the definition of *Adverb;* and the different classes of Adverbs with examples of each. (15)

4. What kinds of *Pronouns* are used as *Adjectives?* Give examples. (10)

5. Write out the Subjunctive Mood of the verb "*to be.*" To what class of verbs does it belong? (15.)

6. Give the 1st per. sin. of any intransitive verb in the different tenses of the indicative; and the 3rd per. plur. of any transitive verb in all the tenses of the subjunctive. (25)

7. What are the necessary elements of a *Sentence?* How may each of these be enlarged? (20)

8. Parse every word in the following sentence: "John carried them safely back to the shore." (15)

9. Analyse the following sentence, and state to what class it belongs:—"I'll kill my horse, because I will not fly." (15)

10. Or this:—

"A *thousand* men have broke *their fast to-day who* ne'er shall dine, *unless* thou *yield* the crown?" (20)

11. Parse fully each word italicised in the last sentence. (20)

12. Give the general analysis of the following lines:—

"If you refuse it,—as in love and zeal
Loath to depose the child, your brother's son,—
Yet know, whether you accept our suit or no,
Your brother's son shall never reign our king:
But we will plant some other in the throne,
To the disgrace and downfall of your house." (25)

13. Write a complex sentence, whose subject shall be a *clause,* and which also contains an Adjectival and an Adverbial clause. (25)

French.

1. Write down the articles in their different forms, singular and plural, and after each write some noun with which it agrees. (15)

2. How is the feminine of adjectives usually formed? Write the feminine of bon, beau, doux, neuf, faux, noir. (20)

3. Write out a list of the relative pronouns, with meanings. (20)

4. How are adjectives and adverbs generally compared? Write in French.—Better, best,—Worse, worst. Also—"He has more men than horses." "I've just as many as you." (20)

5. Write down the cardinal and ordinal numbers as far as 21, inclusive. (10)

6. What are the rules for expressing the negative in French?

Write in French "I have not the horse."—"He has nothing."—"Are you not sick?" "I am neither cold nor hot." (20)

7. Write out the Imperative Mood, and 3rd per. sin. and plur. of the subjunctive tenses, of any verb of the second conjugation, active. (25)

8. How is the Passive formed? Give the 1st. per. sing. and plur. of present and pluperfect tenses of the Indicative and Subjunctive of any verb of the 3rd conjugation, passive. (25)

9. Give examples of the use of (*a*) Reflexive (*b*) Impersonal Verbs. (25)

10. Translate into French:—"Give me the book. It is mine. I lost it here yesterday. I have some money, but I have no bread. I am hungry and thirsty." (15)

11. Translate into French *three* of the following sentences:

(1) "I must rise at 5 to-morrow, or even at half-past four." (2) "He never fails to do it every day." (3) I have been here more than an hour. (4) I forgive you, because I hope you will do better for the future. (25)

12. Translate into English: "Ma mère n'instruisait que mon cœur et ne formait que mes sentiments. Le vieux curé d'un village voisin tenait une petite école pour les enfants de quelques paysans aisés. On m'y envoyait le matin. Je portais de plus sous mon dos, comme les autres, un petit fagot de bois pour alimenter le feu du pauvre curé." (25)

German.

1. Give the equivalents in English letters of the German j, r, c, w, v—with instances; and also instances of variation from the ordinary rule. (10)

2. Write out, with meanings, 3rd pers. sing. of all the indicative tenses (active) of the verb "*haben*." (15)

3. Write out, 1st per. sing. of conjunctive and conditional moods passive of any *strong* verb. (15)

4. Give some of the rules for determining the gender of nouns,—with examples. (10)

5. How are the strong and weak declensions distinguished? Give an example of each. Write out a paradigm of any noun of the strong declension, with the definite article. (15)

6. Write out, in German, the declension of "this green field," in the singular, that of "my new song" in the plural. (15)

7. Decline in sing. and plur. the personal pronoun of the 2nd per. and the fem. of the 3rd pers. (15)

8. Give a list of Demonstrative Pronouns, with meanings. (15)

9. Translate into German: "the house is very small. Have you lost your pen? I have not seen the king. No one has taken your pen." (15)

10. Translate into German: "Can you tell us where he is gone?" "I have much to do." "We shall dine at 2 o'clock." "I hope to see you soon again." "I want to speak to you." "We want some more water." (20)

11. Translate the following:—

Das Madchen aus der Fremde.

I.

In einem Thale bei armen Hirten
Erschien mit jedem jungen Jahr
Sobald die ersten Lerchen schwirrten,
Ein Madchen schon und wunderbar.

II.

Sie war nicht in dem Thal geboren,
Man wusste nicht, woher sie kam;
Und schnell war ihre Spur verloren,
Sobald das Madchen Abschied nahm. (25)

Sacred History.

1. What were the first and the last Plagues of Egypt? Mention some of the circumstances attending the departure of Israel out of Egypt. (20)

2. In what part of the Bible are the Ten Commandments found? In what manner were they given, and to whom? (10)

3. Name the first three kings of Israel, and a few of the circumstances connected with the appointment of two of them. (15)

4. How did Moses displease God? How was he punished? (15)

5. What was God's promise to Abraham? How was it fulfilled? (15)

6. Who were John the Baptist's parents? What was his work? What were the terms of his message? (15)

7. What are the three instances of our Saviour's raising the dead? (25)

8. Give the names of the 12 Apostles. Which of them were writers of books in the New Testament, and of which books? (25)

9. How many Herods are spoken of in the New Testament. Mention some incident concerning each. (20)

10. Who was the first Christian Martyr? Give a short account of his death. (20)

11. What were the principal cities visited by St Paul in his missionary journeys? Give some incidents having reference to each. (25)

English History.

1. What do we know about Britain before the arrival of Julius Cæsar? (10)

2. Give a general sketch of the doings of the Romans in Britain. (20)

3. Give the date of the Saxon (or English) arrival, and write down what you know of the origin of the Saxons, and the circumstances which led to their landing in Britain. (15)

4. Write a short account of the reign of Canut (or Canute.) (25)

5. Give a *list* of principal events in the reign of any *one* of the following kings:—William I., John, Edward III. (20)

6. State the grounds on which the Houses of York and Lancaster respectively based their claims to the Crown. What was the final settlement and its date? (25)

7. Write down a very few words descriptive of any *five* of the following persons—not exceeding three lines for each:—Alban, Agricola, J. Cade, Dunstan, Godwin, Hotspur, Simon de Montfort, Wallace. (15)

8. Give in the *same manner* as above, a description of *five* of the following:—Chatham, Fairfax, Havelock, Jeffreys, Latimer, Raleigh, Strafford. (20)

9. State in very few words the meaning of any six of the following terms:—Cabal, Danegelt, Domesday Book, Interdict, Lollard, Reform Bill, Ship-money, "Six Articles." (20)

10. Write your idea of the character Oliver Cromwell, giving reasons for your conclusions. (25)

11. Write a short life of Wyclif, of Cardinal Wolsey, *or* the Duke of Marlborough—only *one* of the three. (20)

12. Give a short account of the circumstances which led to the Independence of the United States,—with date and reign. (25)

13. Whose son was James I, and how was he connected with the old royal line of England? (25)

Canadian History.

14. Give some of account of any one of Champlain's expeditions against the Indians. What was the date of his death? (25)

15. Briefly describe the last siege at Quebec, with events immediately preceding and following it. (25)

16. Write a short description of the Rebellion of 1837. (25)

17. What have been the most remarkable events of Canadian history since the confederation of the provinces? (25)

Geography.

1. What is meant by the terms Great and Small Circle respectively?

Name and define the principal circles on the terrestrial globe, stating whether great or small. (25)

2. Name the seven largest cities in the world in the order of their size. (10)

3. Name in order the countries bordering on the Mediterranean, and its branch seas, with their capitals; also the principal rivers flowing into those waters. (25)

4. If you wished to travel round the world by the most direct route, briefly describe the course you would take, mentioning the method of locomotion for the different portions of the journey, and naming the chief stopping-places. (25)

5. Give the names and situations of the most remarkable *peninsulas* of the world. (10)

6. Name in order those of the United States which border on British America, and the great Lakes, with their capitals. (25)

7. Write a short description of the Province of Quebec, giving its situation, cities, towns, rivers, boundaries. (25)

8. Describe the principal Rivers of the North-west and Manitoba, with the waters into which they flow, and the chief lakes on the course of each. (15)

9. Give the names and situations of the seas which border the continent of Asia. (15)

10. What are the principal sea-ports of Great Britain? Describe the situation of each. (25)

11. Give a short account of the Gulf Stream. (25)

Natural Science.

1. Explain the terms inertia, gravitation, cohesion, elasticity, momentum. Give the rule for finding momentum (15)

2. In what manner is the weight of bodies affected by distance from the earth's surface? How does the same cause produce difference in weight on different parts of the earth's surface itself? (15)

3. What are the laws for the force of gravity? (15)

4. What are the different kinds of pulleys? What is the law of moveable pulleys? (15

5. What is specific gravity? What substance is taken as the standard of specific gravity? Give such instances as you remember of the specific gravity of other substances? (15)

6. Describe a barometer or an air pump. (15)

7. State the chemical composition of water. Give the weight of a cubic inch of water, and its degree of compressibility. Give the difference in bulk between a certain volume of steam, and the volume of water which produces it. (20)

8. In what respect does water form an exception to the general laws with respect to expansion? At what degree of temperature does this take place? (20)

9. What process causes the heat of *fire* and of *animal bodies* respectively? (15)

10. What are angles of *incidence* and of *reflection*, respectively? (15)

11. Explain the phenomenon of *refraction*, giving examples. Explain the causes which produce the rainbow. (20)

12. Describe the structure of any flower, showing the functions of its principal parts, and giving its genus, order, &c. (25)

13. In what different forms does *carbon* exist in a free state? How may its existence be proved in all these? (25)

14. Explain the terms *acid*, *alkali*, *salt*.

15. What is meant by *oxidization?* Give examples. (20)

16. Describe the process of *circulation of the blood*, giving some account of the organs and principal vessels concerned in it. In what way is this process connected with that of *respiration?* (25)

17. In what way does the action of the earth's internal heat tend to counteract the general lowering of level caused by the destructive action of air, rain,

frosts, rivers, &c. ? Under what circumstances were hills and valleys, for the most part, formed ? (25)

18. Describe an electrical machine, *or* a galvanic battery. (25)

19. Explain the principle of the electric telegraph, and give a short description of the apparatus by which it is worked. (25 to 50)

20 Give an account of the manner in which the changes of the seasons are produced. (20)

Book-keeping.

1. Explain the theory of Double Entry. (25)

2. Explain the terms Sundries, Journalizing, Balancing, Posting, Averaging of Accounts; also the terms Debtor and Creditor, stating what kinds of entries are placed under these two latter heads respectively. (25)

4. I begin business with $5,000, viz: $1,500 cash, $1,500 borrowed from J. Smith for two years at 6 per cent.; and 2 Bills Receivable on R. Gay, & C. Jones, of $1,000 each, payable at the Bank of Montreal, 1st of November, 1882.

I purchased goods from D. Sims to the amount of $3,000, for which I paid $2,000 cash, and gave my note at three months for $1000.

Sold to J. Ralph, goods for $1,500, received his note at 6 months.

Make the necessary entries in the different books. (50)

SOME MAXIMS OF EDUCATIONISTS.

From OSCAR BROWNING'S *Educational Theories.*

"The child must learn to distinguish knowing from thinking or believing."—*Kant.*

"At home one can learn only what is taught himself, at school even what is taught others."—*Quintilian.*

"Give no rules until you have given the matter, the author, and the language. Rules without matter confuse the understanding."—*Ratich.*

"Ask much, retain what you are told, teach what you have retained. A man who teaches another teaches himself."—*Comenius.*

"'Tis not a soul, 'tis not a body, that we are training up, but a man, and we ought not to divide him."—*Montaigne.*

"The greater part of the errors of mankind arise rather from reasoning on false principles than from reasoning badly on the principles which they adopt."—*Arnauld.*

"There are three forces which educate a man—nature, men, and things; of these, only the second is in our power."—*Rousseau.*

THE OBJECT LESSON.

By Miss S. F. Sloan, McGill Model School.

Read before the Teachers' Convention, Sherbrooke, July, 1882.

It was proposed some time ago to give practical lessons bearing on subjects under discussion, or on papers which had been read at the Convention. In accordance with this plan I was asked to give an Object Lesson, and, as the giving of a simple lesson did not seem so formidable an undertaking as writing a paper, I consented to do so.

Dr. Robins, in his paper on Object Lessons, read at the Convention in 1879, has taken up the subject thoroughly, giving the history of the development, the purpose and end to be attained, the definition, scheme, and some examples of Object Lessons; and having studied it carefully and received help from it in my own work, I should recommend all teachers to put the suggestions contained therein into practice in giving their lessons. My lesson is only intended as a help to the few who have never heard one given, and I hope they will bear with me in first referring to the work done in the Primary School in which I teach. My excuse for doing so is that I have found that a talk with other teachers on their work has often been of use to me in mine.

We have three grades of children. The lowest, a class of twenty at the average age of six, have lessons in form and color, such as are beautifully set forth in Calkin's "Object Teaching." A story is often read, or told, them, which they are expected to repeat some other day when we have a conversational lesson, and very simple object lessons, considered principally for their form, color, materials, parts and uses. They are allowed to mention any quality they may notice, using their own words to express it rather than the name of the quality. For instance, in giving a lesson on a pane of glass, I should expect them to say that they *could see through* it, but not to use the word *transparent*. They thus get *ideas* before *words*.

With the next grade of children objects are presented with a view to learning the qualities and their names. Great care is taken, that they may understand perfectly the idea before learning the name, and that very few qualities are considered at first, to prevent confusion of ideas. For example, the quality of *inflammability* is to be learnt; some inflammable object is taken,

that quality is especially dwelt upon, other objects of like nature are produced, and they experiment on them by holding them in the flame of a candle. Then the word inflammable is given, and, with flame to hang it on, they are not likely to forget it. And so with other qualities, let them experiment and find out the qualities themselves. This will give them a chance to do something, which all children enjoy, and they will remember what they learn. In this grade they are expected to use the proper words for their ideas, expressing in one word what would otherwise require many, *eg.*, the word *opaque*, to express that the material of the object cannot be seen through, and that it does not let light pass through it.

The pupils of the third grade, averaging nine years of age, are ready for more advanced lessons, the relation of things to one another, comparing objects together, and their classification. I begin this year with the children by finding out the differences between a plant and a stone, next by comparing a plant and an animal together. Another day we classify a number of substances placed on the table into the three kingdoms. Three of the children are directed to arrange these on three separate chairs, each assigned to a different kingdom. The rest of the children sit in judgment, and when a mistake is made, the one who notices it has the privilege of choosing. At another time the names of sixty substances are written on the board, and the children have several slate exercises, arranging them into the classes named, as, *soluble* and *insoluble*, *native* and *foreign*, *natural*, *prepared* and *manufactured*, &c. They are afterwards required to find other classes themselves. Then we classify birds, first letting them do so themselves. They suggest large and small, or classification according to plumage or country; but these divisions cross one another and have no reference to the life and habits of the birds, hence they are led to choose—*perching* birds, *swimming*, *wading*, generally finding the appropriate name, &c., for the class themselves. Soon we get the seven classes, using seven representative picture cards, comparing each new class with the former, noticing resemblances and differences, eliciting reasons for the letter as adapted to the wants of the bird. Finally we classify the remaining pictured birds (over twenty), comparing each with the representative card. This classification forms several interesting object lessons. A *talk* about the whale on

exhibition in the city led to the formation of a class of "Things found in the sea," the children brought many objects of interest, on which we had lessons, *eg.*, sponge, coral, seaweed, sea salt, starfish and shells. Another plan we have tried is to allow them to observe an object one day, drawing from it facts as to form, color, parts, arrangement, and so on. The next day I give them a "Why" lesson, asking questions on the board as to reasons of form, &c. After they have had time to think and write their supposed reasons, individuals are called upon to read them; each answer is considered by the class, assented to or corrected, by them or the teacher. As an example, let a piece of honey-comb be taken as a subject to excite *observation;* the next day while they are still interested in it, ask, "Why are the cells six-sided?" "Why sealed?" "Why not one large cell instead of many small?" "Why are the edges thicker than sides?" "Why are the ranges separated by half an inch?" &c. Sometimes, in beginning a lesson, the children are allowed *to guess* what we are to talk about, finding out by the sense, or senses, they are permitted to use. For instance, a piece of wax wrapped in paper is handed round. One, feeling it, tells the others it is a hard lump; another, pressing his nail in, says the material is soft; another is shown the color; another by smelling it may discover what it is. As each quality is found it is written on the board, and their guesses must be in accordance with these qualities. Occasionally an object is taken which looks like other objects as alum. They guess rocksalt, washing soda, alum, candy, camphor, &c. These names are written on the board; each one who suggested an object is asked to tell his reason, giving some peculiarity in taste, smell, or feeling, peculiar to that object, and then trying whether the alum possesses that property. In this way they learn the lesson that they must not always judge by the appearance alone. It is necessary to have a certain general plan for lessons for the purpose of training the children to think in an orderly manner, and when the heads of a lesson are written on the board they should be required to concentrate their thoughts on each head, but to prevent this from losing its interest by becoming monotonous, the plan is frequently varied; rules and regulations, set forms and deductions, are laid aside, and they are allowed conversational lessons. With children in the lower grade, one remark suggests another; they sometimes wander far from

the subject (especially if it happens to be a whale, an elephant, a monkey, or a wild animal), to be brought back again by a reminder from the teacher. The next day this may be systematized in a review lesson. The subject I have chosen for my lesson is wheat, on account of its being a common though wonderful and beautiful object.

OUTLINES OF A LESSON ON WHEAT.

I. PARTS.—Roots, stem, leaves, blossoms, ear or head.

II. ROOTS.—*Color*, brown and white.
Form, hairlike rootlets.
Manner of Growing, spreading.
Use (1), to fix the plant to the ground.
(2), to absorb nourishment for it.
An *Annual*—show by drawing or specimens the germination of the seed.

III. STEM.—Green or yellow, cylindrical, long, jointed, hollow, partitioned (let them find out the last by trying to draw air through the stem; explain that 2, 4, 5 and 6 make the stem stronger), flexible, elastic (these with a view to wind; draw from pupils the necessity for both qualities), grows in an upright position (why?) covered with a flinty varnish (why?), the *use* to carry sap and to support the leaves; when cut it is called straw.

IV. LEAVES.—Green, long, tapering to point, two flat faces, grow upwards and outwards from joints, broad stalk rolled round the stem, alternate.
Parts (compare with parts of the hand), skeleton, green pulp, sap and skin, bare, point margin and faces, margin entire, veins parallel.
Use, to take in air through the breathing pores and prepare the sap to nourish the plant.

V. BLOSSOMS.—Small scales, green become yellow, enclose a one-seeded fruit called a grain, use to protect the seed.

VI. EAR.—Consisting of two parts: (1), fibrous stalk, and (2) grain.
1st. *Stalk*, tough, flexible, elastic. Its use to hold grains and carry sap to them.

2nd. *Grain*, consisting of two parts: the "husk," dry, thin, light, yellow (when ripe); the "kernel," white, opaque, solid, composed of the germ of the plant and food for it.

This should be long enough to form two or more lessons given to a class at the average age of nine, who have had lessons on form and names of qualities, nearly all the items might be elicited from them. Again, the whole plant might be taken up.

THE WHOLE PLANT.

I. FAMILY.—Different families of people as of plants, by referring to leaves they will be able to name it, *grass family*. Ask names of different species, show specimens. The family is *large*; different kinds and sizes from creeping grasses to giant sugar-canes, 2,000 different kinds. Draw out their ideas to enable them to realize the number by referring to 10, 100, &c.

II. USES TO MAN.—Show them specimens of the grain in different conditions; in the ear, grain husked, cracked wheat, Graham flour, bran, flour (it will add to the interest to hear what they suppose each specimen is.) Show specimens of the following, asking why they are shown in connection with the subject:—Bread, biscuit, starch, flour, straw, paper, macaroni.

III. WHERE GROWN?—Note particularly our own Manitoba wheat-fields, not found wild, cultivated from earliest times, why? bread, "staff of life." Use of staff in a journey? bread necessary food through journey of life.

IV. SEASON.—*Time of sowing*, fall and spring.
Time of reaping, summer and autumn.
Manner, refer to labor-saving machines.

V. ASSOCIATIONS.—"Sowing and reaping."
Our life compared to the different seasons of the year; that they may get an idea of your meaning, refer to the winter of old age, the hair whitened with its snows; senses numbed with its frosts. Spring, the beginning of growth. What season is a child's life like? Spring, the sowing time. What is sown? Little seeds of habit; let them be good seeds, that they may

become firmly rooted into character; sow well, little grains of knowledge each day, so as to reap golden grain of happiness and success in after life.

A wheat field, the days of life compared to one, orderly rows of wheat, ears alike; plants all busy turning the air, bright sunshine, and rain into useful wheat, growing up daily into the light. What busy days should we liken to wheat? School days. How beautiful to look back upon a whole field of wheat, where each plant has made good use of its time, filling up the ears with "wholesome grain and pure"; no vacant spots where we have neglected to sow our seeds, no blackened, patches of mildewed wheat. Teachers, too, have a wheat-field in which they have sown seed. Can you tell what it is? Is all the year made up of school days? We see something else besides the wheat-plants growing up until "they *laugh* out atop" into wild flowers. What days are they like? They have been called "holidays of the wheat-fields"—these daisies and buttercups that dance in the wind, nod their bright heads, and seem to tell us to be happy also. Would you like to spend all your time as holidays? A field of wild flowers alone is a field of *weeds*.

Many other lessons might be drawn from wheat, but after all the learning we cannot know everything even about a plant of wheat and its wonders. I will close with a little verse that some has written:—

"Flower in the crannied wall,
I pluck you out of the crannies;
Hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

Dr. Abel's Theory of the Growth of Language.—Taking Old Egyptian as his text, he argues that language began with the confused and indistinct, with words that denoted many things, and were at once homonyms and synonyms. Gradually, as the mind of man developed, his ideas, and therewith the words which expressed them, became clearer; homonyms and synonyms tended to disappear; and grammar and vocabulary alike grew definite and exact.—*The Academy.*

THE TEACHING OF FRACTIONS.

By F. C. Haney, *Head Master, Dorchester Street School, Montreal.*

I wish to make my motives and aims in writing this paper clear at the beginning. I think that a great many teachers at first have no particular system of doing their work, especially in teaching fractions until they learn by trial, experiment, and often by failure, some method which they use afterwards. And I am not prepared to deny that a method of teaching reached in this way may be a good one, and produce first class results. But what, I ask, are the effects on those on whom the experiments, the trials and the failures have been made?

I know that very often it is not the fault of these young teachers that they do not know how to teach better at first setting out, but it reflects great credit on those who, starting without any instruction in teaching as an art, still have the ability and determination to become good teachers. They are not to be blamed, for they have not perhaps seen anything better than they themselves are doing. Perhaps they were educated at an academy, where the teacher will ask them to look round the room and see how many nouns they can find, or will tell them that a man having twenty pounds can pay out of it twenty-one pounds, three shillings and sixpence. Or perhaps they have received their education in town or city, and if so they will most likely have been crammed as badly as if they had been taught in—Ontario. It is not to be wondered at here in the Province of Quebec, where so few teachers receive a Normal School training and those who do benefit so little by it, that a great deal of bad teaching is done.

As there are likely to be some here who are just starting on that very useful path in life, the training of the young idea with the aid of book and rod to shoot upward to the light, and who have not yet formed any definite plan of teaching fractions, I thought it would not be altogether out of place to give a few practical suggestions by which they might be guided in forming such a plan. My motive is not to disturb those who are following a system that works well, but simply to speak to those who are commencing the profession who have generally very hazy notions as to how much and how they can teach an average class. The first thing in teaching fractions is to enable your class to get a distinct idea of what a fraction is, to learn the thing itself not its sign,

This can only be done, in my opinion, by actual experiment, that is by taking some such object as a piece of paper and dividing it before them. Divide your object into two parts and many will be able to tell you that each of these is called a half, as it is a fraction they are practically acquainted with. Draw their attention to the fact that they are equal. For this reason, if there are boys in the class, do not use an apple, as the *half* that a boy generally gives his little sister is the core. You can then further divide the object, but still try to keep clearly before them that each piece is equal to every other piece. Then you can tell them that one of these is called a fraction, and you can tell them after that that two or more of them, as long as you have not taken all, are also fractions. Next I think you may venture to give them the definition. It will not do them any injury, even if they do not understand it. They know what a fraction is and that is all you want. If the foregoing has been carefully done the class will be able to give a better definition of a fraction than can be found in three-fourths of the books. If you give them a definition give them this or one that means the same thing,—"A fraction is a part of anything." When you have taught them what a fraction is you can proceed to show them how you write it in figures. This I think is the natural plan. A child has understood the whole significance of the thing *Pa* long before he is taught to recognize the word in a book or to write it with pen or pencil. You would think it strange, if it were possible to do it, if you saw any one teaching her child the word *pa* and, when he knew it at sight and could write it, introducing that very useful member of the family to the child's notice and telling him *that* was the thing that *pa* was the name for and "Johnny you had better remember or I'll whip you."

Of course we all admit that children can be taught to add, subtract, multiply and divide, and perform other operations with fractions without having the slightest idea what they are doing it for. But what preparation is such an education for a life of work and thought, especially in this age when a man needs all his faculties about him to prevent his being merely a piece of drift-wood on the tides that ebb and flow in the great ocean of time. The usual way of teaching fractions is to cause the child to learn the different kinds of fractions at the very outset.

This I have been more and more convinced is not the best way or even a good way, for it is the unnatural way of teaching a

child words instead of things, definitions instead of realities. My opinion is that, when a boy has learned by actual contact what proper fractions are, and how to express them by their appropriate symbols, he should be taught to perform every operation with them that he has learned with whole numbers. I would do this for several reasons; they are the simplest and easiest to understand, they are most used in actual life, and they are the best introduction to the more complex forms. Probably this would be a little awkward where a certain portion of a book is laid down for a class to go over and there can be little or no deviation from the prescribed path, but even in such a case it would pay in the end. I know too that the arithmetics in use are to a certain extent responsible for some of the poor teaching done. Take the definition of a proper fraction that you will see in most of them. "A proper fraction is a fraction whose numerator is less than its denominator." Let us look a moment at this definition. I need not tell this audience, I presume, that the denominator is the name of the fraction, that if we say three-fourths, *fourths* is the name of the thing and the *three* the number of them, that it is the same kind of expression as three apples. How absurd you would think it for a person to say that the three is less than the apples. But I suppose to the end of the world arithmetic will be taught in this way, and men will be found mad enough to write arithmetics with just such definitions in them, and leave said definitions without a word of explanation for the poor teacher to waste her young enthusiasm upon. My definition would be "a proper fraction is any fraction that is less than the whole thing." But if any should not see any force in what I have said and will still say, with a look of surprise beaming from their critical orbs, "But the numerator is less than the denominator."—to such I would beg leave to extend my heartfelt sympathy. One of the difficulties, that teachers meet with in teaching addition of fractions, is that children will often forget that they ought to reduce the fractions to equivalent fractions having a common denominator. They will presist in adding them as they would whole numbers, and the teacher wonders if ever anyone else was plagued with such stupid children little thinking *that* is the cry sent up from many a breaking heart, until it becomes so intolerable that, although they love their work and are devoted to their profession, they frequently sacrifice all their bright hopes—and get married.

Now I think, if the nature of a fraction had been well understood by the pupil, a great deal of this trouble would vanish. If they understood thoroughly that the denominators were the names of the things they were adding, they would see the nonsense quickly enough of attempting to add names. If you cannot get them to see it in any other way, write your denominators in letters instead of figures and they will see it, if nature ever intended they should. This is supposing that, when they were being taught addition of integers, they learned that they could not add nuts to apples and have marbles for an answer. If they were not, it would save time for the teacher to go back with them and commence over again. There was a time in this province, when many teachers did not know why they reduced fractions to a common denominator before adding, but that time will pass away. But I am inclined to think that still many teachers do not think it necessary to teach the children anything about it, thinking I suppose such knowledge too wonderful for them. Perhaps too some of the fault may be in their surroundings. How many have had to deplore the opposition of ignorant trustees or Commissioners to "new-fangled nonsense" as these great men call any attempt to introduce a better state of things. And a great deal of this will always occur, where people will appoint for such places men who can neither read nor write, men who regard the teacher in the light of an ox, a thing to get the greatest possible amount of work from at the smallest possible cost, men who think all teachers should be cripples or lunatics. But if teachers will teach in the way I have pointed out, they will find it labour well invested, for all children, if not crammed, will welcome eagerly anything like a new idea. Get them to understand what they are doing, and you will seldom be troubled with having them add fractions like whole numbers. Another mistake that we very often make is that we imagine children are able to grasp number intuitively because we think we are doing so.

We require too much from children very often. If we could have it impressed on us more strongly than it is, that the mind can intuitively grasp but one object at a time, we should be saved many mistakes and many failures. Especially in teaching arithmetic, would a knowledge of this mental law be useful. We would then reason *from* and *to* one only, and this should begin with concrete *one*. I am confident that we only intuitively grasp

the idea of one object, and then another object, and that, by other powers of the mind, we associate them and thus get the idea of two; that any thing but one involves a process of abstraction, and of course, the difficulties of the process increase with the number of the objects, and also with the decrease in the extent of acquaintance our minds may have had of the process. It cannot then be expected that a child should as readily grasp the relations of numbers as a grown person, who has had some training in these things. Another thing we forget (that I may mention here) is that with the majority of men their knowledge of numbers will depend largely on their memories, and for this reason we have to repeat very often. This reasoning *from* one or *to* one applies more especially in the case of fractions. It might be called the inductive method. Suppose we have the fraction $\frac{3}{4}$, to change to twentieths, the natural way would be something like this: There would $\frac{20}{20}$ in one, in $\frac{1}{4}$ there would be $\frac{1}{4}$ of $\frac{20}{20}$ or $\frac{5}{20}$, then if $\frac{1}{4}=\frac{5}{20}$, $\frac{3}{4}$ would be three times that, or $\frac{15}{20}$. This will be more likely to give the average boy an intelligent idea of what was done than the plan usually pursued which is expressed in the formula, "Divide 20 by 4 and multiply the numerator by the quotient for the numerator, place 20 under it for the denominator." This teaching would soon disappear if all children were like the young lady that Leibnitz undertook to teach. He complained that she always wanted to know the why of the why. We will pass on to multiplication, and in this as in all arithmethical processes, the inductive method is the best, although there is great difficulty in presenting it to the minds of the pupils as it should be presented. If we have a fraction to multiply by a whole number, the difficulty is not so great in getting a class to comprehend it. But when you wish to get them to understand that you are multiplying one number by another, and that in all probability the product will be less than either, you feel as if you had better not go on; that you would like to preach the doctrine of knowledge by faith to that class, and give up your belief in the efficacy of works. And you are right. It is one of the things that we teachers have not a clear enough conception of ourselves, and consequently, we fail in getting others to see what is but dimly realised by our own minds. But it will not make much difference if the pupils do not know the reason why the product is less than the numbers multiplied, if in your multiplying

you have made plain each of the steps in the way. When they know they are doing right and going in the right direction, they will not donbt the result. But you can tell them that it is quite natural; that whole numbers and fractions are like two roads leading in opposite directions from the same point, *one*; and that the farther we get on by one road, the numbers become greator in value, and that they become less on the other; that if you multiply any two numbers on one side, the result is a number farther away from *one* than either, and what more natural than to expect the same on the other. We may take $\frac{2}{3} \times \frac{4}{5}$ and see what we can make of it. If we multiply $\frac{1}{5}$ by 2 we have $\frac{2}{5}$, therefore $\frac{4}{5}$ multiplied by 2 will give us $\frac{8}{5}$; but we are not multiplying by 2 but by something that is less than two; we are multiplying by thirds which are three times less than ones, so that, in multiplying by 2, we are multiplying by something that is three times too much, so that our result, $\frac{8}{5}$, is three times too great; therefore, we ought to have $\frac{1}{3}$ of $\frac{8}{5}$. Then $\frac{1}{3}$ of $\frac{1}{5}$ is one of the three equal parts, into which $\frac{1}{5}$ may be divided. If each fifth is divided into three equal parts, $\frac{1}{5}$ or the unit will be divided into five times three, or fifteen equal parts, and each of the parts will be a fifteenth, hence $\frac{1}{3}$ of $\frac{1}{5} = \frac{1}{15}$, and $\frac{1}{3}$ of $\frac{8}{5}$ will be eight times $\frac{1}{15}$ or $\frac{8}{15}$, therefore, $\frac{2}{3} \times \frac{4}{5}$ is $\frac{8}{15}$. This can be made quite clear I think to almost any capacity, by going over each step and not leaving it till it is understood before proceeding to the next. I leave this now, hoping that these weak suggestions may be of some use, and I regret that it was not taken up by some one abler and of more experience in the profession than myself. And I also much regret that a good professional training is not within the reach of all the young teachers of this Province. I suppose the time is coming, though *we* shall hardly be able to wait for it. But, as teachers, we should never forget that we sway the destinies of the world; that, unknown and despised as we often are, from our hands and from our influence go forth those hands that in the future shall wield the sceptres of the world, those whose influence must be felt for good or evil through the endless years that are yet to be.

School Libraries in France.—The *Academy* tells us that School libraries are greatly on the increase in France. In 1865 the number was only 4,833, and in 1874, 16,648. There are now 25,913. This does not include the teachers' libraries, which number 2,348, with an aggregate of five hundred thousand volumes. How necessary such libraries are as a part of a well-equipped school, all those engaged in education will testify.

THE TRANSIT OF VENUS.

By A. Johnson, M.D., LL.D.

What is the transit of Venus? When will it happen? Shall we see it here? Why are astronomers so eager to witness it? Will it be a grand sight? are some among the many questions that are asked by readers of the frequently recurring notices in the newspapers of the preparations for the approaching event. The following is an attempt to answer them. The transit or passage referred to is simply the passage of the planet Venus, which may now be seen shining so brightly in the western heavens shortly after sunset, directly between us and the sun, and those who imagine that there may be some magnificent phenomena connected with it will be very much disappointed. A black spot, less in diameter than the thirtieth part of the sun's diameter, will be seen even without a telescope, but through a smoked glass, to cross the lower part of the sun's disc in a direction slightly inclined upward. That is all.* This will happen on December 6th next, and will be visible at Montreal if the weather be favorable; a matter which is very doubtful. The beginning of the passage ("External contact at Ingress") will occur about nine minutes past nine a.m., Montreal time, but this will be hardly noticeable. The planet will be fully on the disc, and its edge will touch the sun's edge, or what is called "Internal contact at Ingress" will take place about 9h. 30m., a.m. The passage will then continue across the disc until 2h. 51m., p.m., when the edge of the planet will again just touch the edge of the sun (the planet being still fully on the sun's disc). This latter is called "Internal contact at Egress." Venus continuing to move onwards will finally pass entirely off the sun's disc ("External contact at Egress") about 11 minutes past three p.m. The same phenomena will be visible at very nearly the same instant over a great part of Canada, occurring only from two to six seconds later at Ottawa, and a few seconds later still at Toronto, for example. But although at nearly the same time absolutely, the hours and minutes which denote the local time, will, of course, be different. The difference between

* The contact at Ingress will occur at a point on the sun's disc making an angle from the North point of 145° towards the East. The contact at Egress will be at a point 114° from the North point towards the West.

Montreal and Toronto time, for example, being about 23 minutes, we shall have to subtract 23 minutes from the times given above in order to find the local times for Toronto. So for other points of Canada, the local times corresponding to the Montreal times given above will be the times for observing the four contacts mentioned. Greater precision of statement is unnecessary, as the actual astronomical data can hardly be relied on to give a higher degree of accuracy. The times given above can hardly be depended on within less than two minutes. The phenomena will be visible about the same moment over a great part of the United States also; and some, if not all, the contacts may be seen, though not at the same absolute time, all over South America, the West Indies, in Great Britain and the West of Europe, Africa, Madagascar, part of Australia, New Zealand and the South Pacific Ocean. These places will be dotted over with the stations of small observing parties sent out by most of the civilized nations of the earth. The Imperial Parliament has made a preliminary grant of about $75,000 for expenses; the United States have given the same amount, and other nations are not behind them in liberality. The cost of the whole will come to a very large sum, and if we add to this the cost of the various similar expeditions in 1874, and before that in 1769 and 1761, the sum total cannot fail to impress the mind with a sense of the strong interest felt by civilized nations in the solution of the problem attacked; a problem which engaged men's attention more than two thousand years ago; a problem which is associated with the name of Pericles and Anaxagoras, Aristotle, Kepler, Flamsteed, Halley, and others of more recent times. From mere guesses at first, a nearer and nearer approach to an accurate answer to the question involved has been made, but a final satisfactory result has not yet been attained.

What is the problem? It may be described as a problem in surveying on the grandest scale. When a farmer or the owner of a large estate gets his land mapped out, and its size ascertained exactly, the advantages as well as the satisfaction arising from this are obvious. So, on a higher scale, are those of the Ordinance Survey of Great Britain or the like work for any other national territory. Rising still higher we come to those surveys which have had the mapping out of the whole earth and the determination of its size, for their object. Higher again, we consider the earth as one body in the solar system, which system is to be

accurately surveyed. Beyond this comes the step which leads us from the solar system itself to the dimensions of the visible universe. But with this our present subject has no immediate concern, although there is a close connection.

Confining our attention to the solar system we may, from one point of view, compare our knowledge of it to that of an estate or territory of which a very accurate map has been made, so far as the relative positions and dimensions of all the parts are concerned, but on which, from some oversight, the scale has been inaccurately drawn. Suppose, for example, it was uncertain whether a mile was represented by an inch or an inch and a quarter. (This, however, would be a great exaggeration of the uncertainty in the case of the solar system.) The result of this uncertainty, of course, would be that the actual distance in yards or miles between any two points, or the number of acres in any given area, could not be ascertained. Similarly, for the solar system we know the relative distances, the relative sizes, and even the relative weights of the planets and the sun; but there is a good deal of uncertainty about the scale, and hence we cannot say positively what is the actual number of miles in any required distance. Our ignorance is, however, due not to any oversight, but to the difficulty of the measurements required to enable us to lay down the scale. Our unit of measurement is the distance from the sun to the earth, and this has never yet been determined in miles to the satisfaction of astronomers.

How then can the distance of the sun be found by observing the passage of Venus across his face? To explain this simply, it will be better to consider, not the distance of the sun, but the diameter of the sun in miles as the object of search. If either can be found, the other can be calculated from it by a simple proportion (which need not be here discussed), so that the above question becomes—"How can we, by observing the passage of Venus across the sun's disc, find the diameter of that disc in miles?" A general explanation is of course all that can be attempted here. Referring again to the illustration of the map, but letting the map now correspond, not to the solar system, but to the sun's disc only, it is obvious that if we knew the actual distance in miles between any two points represented on the map, we could readily find the distance in miles between any other two points, the map being supposed accurately drawn. For example, if we have a map of Montreal, carefully

drawn, but without any scale attached, we could by knowing the distance between the two parallel streets, such as St. Catherine street and Dorchester street, tell the entire length of the city; because the proportion of this length to the other is given by the map. Similarly in the case of the sun's disc, if we knew (1) the distance in miles between any two parallel lines on its surface, and (2) the proportion of the whole diameter to this distance, we evidently can find the diameter. The problem thus put consists of two parts:

First, The distance of the two parallel lines in miles.

Secondly, The proportion (or to speak accurately, the *ratio*) of the diameter to this distance.

If we reverse the order of these, we may say that they correspond to

First, Drawing a map, but without knowing the scale.

Secondly, Finding the scale.

The map, however, we have to draw of the sun's disc is a mere outline. If we draw any circle to represent the sun's disc, we have merely to lay down on this circle a diameter and two other lines parallel to one another. But how are the lines on the sun's face to be selected? This may be explained by another illustration. Go into a room with a gasalier hung from the ceiling, sit down on a chair, look at one of the glass globes, and notice what part of the opposite wall it hides from you, then sliding the chair in a straight path across the room observe that the part of the wall hidden from time to time during the motion will form a line on the wall. Next stand up, and moving along the same path on the floor, you will, of course, see that the glass globe hides a different line on the wall. It is clear that the distance apart of these two lines depends on the differences of the heights of the eye in the two cases and on the relative distances of the glass globe from the eye and the wall. Here the wall corresponds to the sun's face; the glass globe corresponds to Venus, and would correspond better if it moved across between you and the wall, instead of compelling you to move in order to produce the same effect. The positions of the eye in the two cases correspond to the positions of two observers—one, suppose, in the southern, the other in the northern hemisphere. Two such observers looking simultaneously at Venus would see her trace two different parallel lines across the sun's face by hiding the parts of them in succession. The distance

apart in miles of these two lines can be found without any great difficulty, because it depends, obviously, on the distance between the stations of the two observers, which is easily found, and on the known ratio between the distances of Venus from the sun and from the earth. Thus one part of the problem is solved, viz., that corresponding to measuring the distance between two parallel streets on the map of Montreal. The more difficult part, however, remains, viz., that which corresponds to finding the ratio on the map between the length of the whole city and the distance just mentioned. We have to find the ratio of the whole diameter of the sun to the distance between the two lines on its surface that have been observed. The observations for this purpose are simply enough stated. The two observers already mentioned have only to notice the exact duration of the passage in each case. The two durations will plainly be different. The planet crosses nearer to the centre of the sun in one case than in the other. It will therefore have a longer path, a greater chord of the circle to travel, and therefore take longer to cross. Its rate of travelling from point to point in the heavens (*i. e.* the arc on the sky, it will pass over in a given number of hours) is known. Hence, if the observers note carefully how long it takes in the transit, the lengths of the two parallel chords are known. But not in miles. They are only known thus far, that if we draw any circle on paper to represent the sun's disc we can lay down on it, on the same scale, the two chords, because we can measure the arc on the sky covered by the sun's diameter. Now, when these chords are drawn correctly to scale on the circle on paper, we may measure in inches their shortest distance apart, and by measuring also in inches the diameter of the circle, we have the ratio of the diameter to this distance, and this is the very number we wanted to find. We know now the number by which we must multiply the distance apart of the two chords in order to find the diameter; but this distance in miles can be found as already described, and thus the length in miles of the sun's diameter can be found. Hence the magnitude of the solar system can be determined. Thus our problem is solved. All that is required by theory is that the observers should notice the exact moment when Venus is first in contact with the sun's disc in going on, and last in contact in passing off. This method suggested by the illustrious Halley is simple enough. There are, however, many practical difficulties. One may be

noticed here. It demands that the sky should be clear both at the beginning and end of the transit, and as a transit may last six hours the risk is much greater than if only a single observation were required. Considering this, De l'Isle in 1753, pointed out that it was possible, adopting the fundamental principle of Halley's method, to solve the problem by a single observation of a contact either at the beginning or end, at places properly chosen whose longitudes could be obta ned with great exactness. It is on this method, as regards the observation of contacts, that reliance must be placed in the coming transit.

INSPECTOR HUBBARD'S REPORT.

For the Year ending June, 1882.

SHERBROOKE, August 21, 1882.

TO THE HON. GÉDÉON OUIMET,
Superintendent of Public Instruction.

SIR,

I have the honor to submit my Annual Report, with the Statistical Tables, for the past scholastic year.

The Statistical Tables may require some brief explanation. I had prepared my Table ready for transmission, some months since, upon the old blanks, when I received new blanks, requiring some additional particulars, of which I had no record; and I was, therefore, under the necessity of making my summer visits to the schools before I could be in a position to fill out the new classification required. With regard to this new classification, viz., as Catholic, Protestant, and Mixed, I beg to explain that, owing to the fact that my inquiries on these points were made after the close, in most cases, of the terms of schools for which other statistics had been taken, and that, in several instances, schools were closed, my Table is only approximately correct,—although I have done all in my power, under the circumstances, to make it as nearly correct as possible. I beg also to explain, as I have previously stated to you in correspondence, that the new Table seems to me to confuse some items which, in the old Table, were distinct and clear; as I see no way of distinguishing in the case of schools entered as "*Mixed*," whether they are under the control of commissioners or of trustees, or are independent. I have therefore sent both Tables, the old and the new; the

former will show the items above referred to. I may remark that, as compared with previous years, the Table shows a fair general improvement in several particulars. There has been a slight gain, on the whole, over last year, in the number of schools in operation, and in the attendance.

As regards *School-buildings*, there have been several casualities and also several improvements. Of the former, the loss by fire of the buildings of St. Francis College, Richmond, the Danville Academy, a school-house in Robinson, Bury, and one in Newport, may be especially noticed; the losses were partially covered by insurance. In the way of improvements, a large addition was made to the Coaticook Academy building, rendering it much more commodious and convenient for the purposes of a graded school. A model school-house has been built at Kingsey Falls, two new school-houses in Newport—one to replace the one burned, and the other in a new district—and one also in Dunham. A new model school-house is also in process of construction in Dunham, and two or three school-houses in other municipalities. Repairs, more or less extensive, have been made in a number of instances. In the case of the Danville Academy, it is proposed to erect a much better building than the one lost, to be so constructed as to provide well for a *graded school*. The other losses also will doubtless soon be replaced. There are now but few school-houses, comparatively, which have to be classed as "*bad*" or "*indifferent*," though a larger number can be ranked as only "*middling*". This fact will appear in the *bulletins* sent of the several schools. There has certainly been *improvement* during the year, in regard to school buildings.

As to *School Appliances*, I cannot report very marked advancement. In a few instances, something has been done in the way of furnishing maps, &c.; but there is still very great room for improvement—the lack is almost universal.

As regards *Teachers*, there has been unusual scarcity of those legally qualified. This has been owing, in part, at least, to the revival of "better times" in other departments of labor, and the tardiness of School Boards, generally, in increasing wages offered. In several cases, schools have remained closed for part of the year for want of teachers; and in more cases than usual, teachers not holding diplomas have been temporarily employed. There has been a slight general increase in the wages paid,

though not in proportion to the scarcity; and municipalities have not generally retained the "*stoppages*" required by the Pension Act, thus really adding two per cent. to the salaries. Owing to the scarcity, Catholic teachers have been employed in quite a number of Protestant schools. The proportion of male teachers has been unusually small. Teachers generally have shown fair efficiency, and I have seldom seen evidences of incompetency or of marked inefficiency. More frequently I have occasion to call the attention of teachers to want of thorough instruction or of systematic arrangement.

In the matter of *Text-books*, uniformity is gradually prevailing; though in several sections, unauthorized books are still used; and in some cases, the gradual introduction of authorized books causes, for the time, more confusion. The teachers too frequently use their influence against the use of authorized books.

In the matter of *Finances*, no special troubles have arisen. As the times have been better, collections have generally been easier; and, as a rule, the teachers are paid with promptness. This ought to be true in every instance; I am confident that the exceptions this year have been fewer than usual.

Since my last report, I have visited all the schools under my supervision, which were in operation at the time, twice. During the year, however, I visited all once; and all twice, excepting six in summer, and fifteen in winter. The winter was unusually unfavorable for travelling; and many of my visits during that season were made with much difficulty and hardship. So large is the number of schools which I have to visit, that I find it impossible to avoid occasional omissions. I am, however, careful in all cases to go to those schools on my next tour. I also find it impracticable, in general, to give notice of intended visits; and I may venture to suggest a doubt as to the advisability of such notice, when practicable.

A few schools which I have, up to the present time, visited and reported, have become so largely Catholic in their attendance, that it would probably be better that they should be visited by the Catholic Inspector. I may mention No. 16 of Stanstead, County of Stanstead, Nos. 13 and 14 of Ascot, County of Sherbrooke, and No. 3 of Cleveland, County of Richmond.

As I have given the details of each municipality in my Statistical Table, and in the Bulletins of visits, it seems unnecessary to

recapitulate in this report. I shall endeavor to furnish promptly any additional information which you may require.

I have the honor to be, Sir,

Your obedient servant,

H. HUBBARD,

Inspector of Schools.

INSPECTOR THOMPSON'S REPORT.

For the Year ending June, 1882.

LEEDS, 11TH JULY, 1882.

TO THE HON. SUPERINTENDENT OF EDUCATION.

SIR —I have the honor to forward the enclosed statistical table with my annual report for the year ending June 30th, 1882.

No great changes have taken place, but I am happy in being able to state that much progress has been made in the majority of the schools in this district during the year.

There were in operation this year seventy-nine schools, attended by two thousand, one hundred and fifteen pupils; one thousand and ninety-one boys, and one thousand and twenty-four girls. The average attendance during the winter months was one thousand, six hundred and five. Eighteen of these schools were kept open only part of the year. These seventy-nine schools are distributed over my district as follows: forty-six are in the County of Megantic, twenty-five in Compton, three in Wolfe, three in Dorchester, and two in the County of Beauce.

Generally speaking, the teachers have been diligent in the discharge of their duties, and have in most of the schools done good work. There is no doubt that the staff of elementary teachers in this district has very much improved during the last few years. A large number of them have been trained at the Inverness Academy, which has been ably conducted for the last four years. A good number are pupils of the McGill Normal School. This improvement is largely owing to the amended regulations for granting diplomas by the different Boards of Examiners.

I should wish to see yet another reform in these regulations, and one which was recommended by the Convention of Protestant teachers lately held in Sherbrooke: That the written papers of

the different candidates should be examined and decided upon by a Central Committee.

There are in this district eleven male teachers, and sixty-eight female teachers. They are all with only one exception provided with diplomas.

The School-houses in this district are being considerably improved. An excellent one has been lately built in the municipality of Inverness. The School Commissioners of this Municipality have also furnished their schools with the improved patent seats. I trust that other Boards of School Commissioners will follow their example before the expiration of another year. I have still to regret that the elementary schools are not properly supplied with maps, without which Geography cannot be successfully taught.

There are four superior schools in this district, viz., the Model Schools of Leeds Village. Maple Grove, and Scotstown, and the Academy at Inverness. I did not consider it necessary to examine these schools this year, as they have been inspected and reported by Professor Weir, Inspector of Model Schools and Academies.

The best elementary schools in this district are those taught by Mr. George Murray and Miss Catherine McKillop, of Inverness, Mr. John Parker, and Misses Mary Kerr, Margaret Allan, and Mary Ann Thompson, of Leeds, Miss Margaret Ross, of Lingwick, and Miss Anna M. Cameron, Stornoway.

By special request I visited the Protestant School on the Kennebec Road, Municipality of Linière, on the 14th of January last. I have already sent you a report of this School. I have also been authorized to inspect, once a year, the Protestant Schools of the County of Lotbinière. I will make this inspection as soon as possible and report to you.

By referring to the annexed statement you will see that, although there were more schools in operation this year than last, the average attendance has diminished. This was chiefly owing to the prevalence of epidemic disease in the Townships of Leeds and Inverness, which necessitated the closing of several of the schools for some time. I am glad to see that the number of pupils studying Mental Arithmetic this year has increased to nine hundred and ninety-three, being two hundred and thirty-three over the number given last year. The number studying drawing has decreased since last year by one hundred and two. Very few of

the teachers care to teach drawing in their schools, they having never learned it themselves.

STATEMENT OF THE NUMBER OF PUPILS STUDYING EACH BRANCH OF EDUCATION AS COMPARED WITH LAST YEAR.

	1880-81	1881-82	Increase.	Decrease.
Number of Municipalities	20	20		
" Schools in operation	77	79	2	
" Pupils	2111	2115	4	
Average attendance	1649	1605		44
Number of pupils writing	1373	1417	54	
" Learning Arithmetic	1305	1348	43	
" " Mental Arithmetic	760	993	233	
" " Book-keeping	173	110		63
" " Mathematics	62	81	19	
" " Mensuration	15	36	21	
" " English Grammar	668	686	18	
" " French	54	70	16	
" " Analysis	144	172	28	
" " Composition	385	378		7
" " Geography	806	816	10	
" " History	702	642		60
" " Drawing	145	43		102
Number of Dissentient Schools	10	8		2
" Pupils	235	209		26
Average Attendance	176	140		36

Hoping that the foregoing, along with the statistical report and bulletins of inspection will be sufficient to give a good idea of the state of the schools in this district,

I have the honor to be, &c.,

WM. THOMPSON,
Inspector of Schools.

CIRCULAR TO THE PROTESTANT INSPECTORS.

DEPARTMENT OF PUBLIC INSTRUCTION.

QUEBEC, 17th Nov., 1882.

SIR,—In order to facilitate the work of this Department and to promote the interests of Education in your district of Inspection. I have the honor to request that you will observe the following instructions concerning the work of Inspection in your District:

I.—ACT VICT. 43-44, CHAP. XXII.

To establish a Pension and Benevolent Fund in favor of officers

of *Primary Instruction*,—Sections 17 and 18 of this Act provide as follows:

"17. The salary of directors or teachers employed in schools subsidized by Government or school municipalities shall be estimated and determined by the school inspector of the division to which such directors or teachers belong, and this to the satisfaction of the Superintendent, who may order an enquiry for such purpose, in accordance with the law respecting education."

"18. In case lodging, board and fuel, or any of them, are included in the amount of a teacher's salary, the amount representing such lodging, board or fuel shall be estimated and established to the satisfaction of the Superintendent, by the school inspector of the division to which the teacher belongs."

You are therefore requested to report upon the salaries of teachers in the different municipalities in your district of Inspection, in accordance with forms to be provided by this Department, taking care to insert no item in the report which does not properly form part of the teacher's salary. These reports are to be checked and countersigned by the Secretary-Treasurer of the municipality. In districts where the school year is divided into a Winter term and a Summer term, you will call the former the first six months and the latter the second six months of the year. This report is to be made semi-annually.

II.—The Educational Record.

Great difficulty has been experienced in providing the Elementary teachers with the monthly issues of this Journal. In order to facilitate the distribution, you are requested to prepare, at your earliest convenience, a report giving the *number* and *local name* of each school district in the several municipalities of your district of Inspection and presenting the school districts of each municipality arranged in groups under their respective Post Offices. The Post Office at the head of any group will thus be the Post-Office address of each school of that group. You will forward this report to the Department not later than the first week in January next. If your report is not then complete, a supplementary report can be added, when the information necessary to complete it has been obtained.

III.—Bulletins of Inspection.

(A). Instead of "name *or* number of School," read "name *and* number," if both exist.

(B). After Name, Diploma and Salary, &c., report the salary as follows:

1. When the teacher is engaged by the year, place salary over the number of months teaching, thus $\frac{300}{9}$ signifies $300 for 9 months;

2. When a teacher is engaged by the month and paid in cash, give the salary multiplied by the number of months, thus: ($16 × 4) signifies $16 per month for four months;

3. When a teacher is provided with a permanent boarding place, in addition to the cash payment add B for board, thus: ($10 × 4) + B., signifies ten dollars per month for four months and board.

4. If a teacher is required to "board round," add B. R. thus: (10 × 4) + B. R. signifies $10 per month for four months and "board round."

(C). Under "remarks" state whether the Educational Record is received by the teacher or not, inserting "Record received" or "Record not received," as the case may be.

IV.—Classification of Municipalities.

In your annual reports to this Department classify the School municipalities of your Inspectoral District under the following Heads: 1, excellent; 2, good; 3, middling; 4, bad; 5, very bad; arranging the municipalities of each class in order of merit.

The classification is to be based upon the following points.

1. The manner in which School Commissioners and Secretary-Treasurer discharge their duties.
2. The condition of School Houses.
3. School Apparatus.
4. The use of authorized text books.
5. The efficiency of the teachers.
6. The salaries of teachers and method of payment.

V.—Teachers' Meetings.

As the great majority of the teachers of the Elementary Schools of this Province have received no professional training, every

effort should be made by the Inspector to bring before the notice of the teachers of his district the best methods of conducting the work of the Elementary Schools.

You are therefore requested to hold, at least once a year, a meeting of teachers in each County, for the purpose of considering the difficulties, defects and desirable improvements of the schools of the County, and also for the purpose of illustrating, by means of Papers, Model Lessons, &c., the best methods of teaching and organizing Elementary Schools.

A Public Meeting, with Addresses upon Educational Topics, would form a very valuable closing session for such meetings.

If found desirable, the teachers of two adjacent Counties may, on application to the Superintendent, be united for the purposes of such meetings.

VI.—Drawing.

I have, on former occasions, directed your attention to the teaching of Drawing as part of our Elementary School Course, and I am glad to be able to note that much progress has been made in the introduction of this subject into the Elementary Schools of this Province. There remains, however, much to be desired in this connection. I request, therefore, that you will strongly urge upon your teachers the introduction of this subject into the Elementary Schools, pointing out—

(*a.*) That the subject of Drawing is receiving more and more attention from Educationists.

(*b.*) That a teacher without special training in Drawing, can conduct a class of young children in this subject very successfully with the assistance of Walter Smith's Manual.

(*c.*) That the youngest pupils in the school should begin Drawing Exercises.

(*d.*) That for the first two or three years pupils can be profitably employed in copying, with Slate and Pencil, figures placed upon the Black-board by the teacher.

GÉDÉON OUIMET,
Superintendent.

STATEMENT OF REVENUE and Expenditure of the Protestant Board of School Commissioners, Montreal, from 1st July, 1881, to 30th June, 1882.

REVENUE.			EXPENDITURE.		
To Balance on hand as per last year's statement		$82 35	By Maintenance of Schools for 1881-'82, as per abstract annexed	$72,106 55*	
" City School Tax for 1881	$6,138 50		" Prize Books and Medals	595 75	
Less amt. advanced as per preceding statement.	6,443 26				72,702 30
		59,695 24			
To City School Tax on account for 1882		8,613 79	By Secretary Superintendent's Salary	*2,200 00	
" Government Grant, "Common School Fund"		3,699 74	" Accountant's Salary	*1,300 00	
" Govern't Grant, "Superior Education Fund for education of 30 free pupils"	1,173 15		" Office Expenses	*252 60	
					3,752 60
" Ordinary Fees, High School of Montreal	6,283 25		" Miscellaneous Charges	550 15	
" Ordinary Fees, High School for Girls	5,506 91		" Printing	166 60	
" Ordinary Fees, Preparatory High School	3,881 25		" Advertising	80 63	
		16,844 56			797 38
COMMON SCHOOL FEES.			" Interest on $300,000 Bonds at 6 per cent.		18,000 00
" Point St. Charles School	855 40		" Sinking Fund for Redemption of Bonds		6,349 48
" Mill Street School	184 10		" Interest on Land and Mortgage and Overdrafts at Bank		2,648 63
" Royal Arthur School	1,622 10				664 15
" Ann Street School	1,332 80		" Pension Fund, amount deducted from Grants		
" Senior School	1,581 00		By Land on Sherbrooke & St. Hypolite Streets.	3,212 50	
" Ontario Street School	350 80		" Land at Point St. Charles	438 48	
" British and Canadian School	1,296 55				3,650 98
" Sherbrooke Street School	1,891 50		By New High School		30 00
" Dorchester Street School	14 50		" Cash in Hand		1,232 24
" Paret Street School	99 30				
		*10,528 05			
" Pension Fund, amount deducted from salaries		615 50			
" Bill Payable		4,249 12			
Total advances Molsons Bank	17,548 59				
Amount advanced as per preceding statement.	11,549 18				
To additional advances during present school year		5,999 41			
		$110,327 76			$110,327 76

* Including the Fees of June, 1881.

*Including the Salaries for June of the preceding year.

Audited and found correct.

COURT, MACINTOSH & HYDE, Auditors.

ABSTRACT SHOWING COST OF MAINTENANCE OF SCHOOLS FOR 1881-82.

	Salaries.	Stationery.	Charges.	Fuel.	Repairs	Gas, Water and Assessments.	Total.
High School of Montreal	$13,111 10	$109 08	$155 59	$329 77	$209 86	$795 16	$14,710 56
Girls' High School	7,025 47	59 97	177 23	320 77	190 79	795 17	8,578 40
Preparatory High School	3,552 46	58 10	38 95	92 02	55 85	190 52	3,987 90
Point St. Charles School	3,588 24	32 82	80 57	373 34	59 22	292 22	4,427 01
Mill Street School	412 50	1 15	12 89	34 95	80	3 80	466 09
Royal Arthur School	5,238 51	62 34	129 52	481 11	109 61	406 15	6,477 24
Ann Street School	5,607 93	59 32	91 66	538 70	223 85	271 39	6,792 86
Senior School	3,752 34	20 45	48 60	141 41	18 99	232 11	4,213 90
British and Canadian School	4,870 53	44 10	71 93	413 12	64 67	166 08	5,630 43
Sherbrooke Street School	5,983 73	71 02	115 01	492 56	102 20	210 47	6,974 99
Dorchester Street School	2,169 40	18 72	2 50	129 24	8 74	56 95	2,385 55
Ontario Street School	1,263 29	5 53	14 44	123 08	71 48	87 90	1,565 72
Panet Street School	3,832 13	46 16	65 51	475 55	91 33	166 33	4,677 01
Model School, Stanley Street	360 00						360 00
Hebrew School	858 89						858 89
	$61,766 52*	$588 76	$1,004 40	$3,954 62	$1,208 00	$3,674 25	$72,106 55

* Includes salaries for June of the preceding year.

HENRY EVANS, Accountant.

Audited and found correct.

COURT, MACINTOSH & HYDE, Auditors,

Montreal, 26th September, 1882.

To the Chairman and Members of the Protestant Board of School Commissioners.

Gentlemen,—We have now to report the completion of the Audit of the books of your Board for the year ending 30th June, 1882.

The disbursements as per Cash Book have been checked with the vouchers and found correct.

The receipts have been verified by the City Treasurer's statement of School Taxes, the Secretary-Superintendent's certificate of School Fees and the Bank Book.

The journalizing of the Cash and posting of same into the Ledger have been checked and found correct. The additions of the Cash Book, Journal and Ledger have also been checked.

The enclosed statement of Revenue and Expenditure shows a correct abstract of the receipts and disbursements for the year. The Balance Sheet herewith shows the position of your Board on 30th June, 1882, as per your Books.

We are, gentlemen, yours obediently,

COURT, MACINTOSH & HYDE, *Accountants.*

STATISTICS OF ATTENDANCE IN THE HIGH, SENIOR, COMMON AND SUBSIDIZED SCHOOLS, under the control of the Protestant Board of School Commissioners of Montreal, for the year ending June 30th, 1882.

Name of School.	Number of School Days.	Average Enrolment.	Total Days of Attendance.	Per cent. of Daily Attendance.	No. of times Late.
High School of Montreal, including Preparatory	194½	320·1	58,483	94	6·3
High School for Girls	195	164	30,158	94·3	2·2
Senior School	193	132·6	23,552.½	92	·5
Common Schools	195½	2,825·9	489,016	88·5	2·6
Hebrew School	170	119	13,428	66·3	7·7
St. George's School	186½	114·9	18,703½	87·3	6·6
Total, 1881-82	.....	3,676·5	633,341	.....	.....
Total, 1880-81	.....	3,610·8	643,457½	.....	.....

The last column shows the number of times each pupil has been late during the year on the average.

STATEMENT OF NUMBER OF TEACHERS AND PUPILS IN ATTENDANCE AND COST OF EACH PUPIL IN EACH SCHOOL.

Name of School.	Average Number of Teachers.	Average Number of Pupils.	Total cost of Maintenance.	Fees.	Net Cost.	Net cost per pupil 1881-82.	Net cost per pupil 1880-81.
High School for Boys	26	320-2	$16,953 72	$11,337 65	$5,616 07	$17 54	$16 40
High School for Girls		164-	7,925 98	5,506 91	2,419 07	14 75	12 69
Senior School	4-	132-6	3,723 57	1,425 50	2,298 07	17 33	32 11
Point St. Charles School	7-4	261-3	4,132 93	774 20	3,358 73	12 86	10 64
Mill Street School	1-4	60-1	428 59	172 60	255 99	4 26	8 11
Royal Arthur School	11-6	507-9	5,992 08	1,477 10	4,514 98	8 89	9 54
Ann Street School	10-9	421-6	6,173 20	1,214 10	4,959 10	11 67	13 40
British and Canadian School	10-9	412-7	5,187 77	1,177 25	4,010 52	9 72	10 94
Ontario Street School	3-	130-1	1,452 39	323 00	1,129 39	8 68	8 46
Sherbrooke Street School	13-7	574-4	6,443 33	1,724 80	4,718 53	8 22	8 45
Dorchester Street School	4-9	165-	2,190 55	471 50	1,719 05	10 48	11 09
Panet Street School	7-9	292-9	4,324 85	821 30	3,503 55	11 97	12 40
Total for Common Schools including Senior School	75-7	2,958-5	40,049 26	9,581 35	30,467 91	10 30	11 42
Subsidized Schools	7-	242-3	1,128 89	.....	1,128 89	4 66	7 49
Total for all Schools	108-7	3,685-	66,057 85	26,425 91	39,631 94	10 76	11 76
Total for all Schools, 1880-81	110-1	3,610-8	69,666 40	27,217 70	42,448 70	11 76	

EDUCATION IN SAXONY.

A recent number (No. 29, July 22nd) of the *Philologische Wochenschrift* reproduces an important missive of the Saxon Education Department, calling upon the rectors of the Gymnasia, or grammar schools, to meet and consider the grave dangers which have arisen from the too rapid development of new ideas and the so-called reforms in higher education. The minister considers that the ever-growing criticism of classical studies as unpractical, and the desire to replace them by something more obviously useful, arise from the mismanagement of these studies; first, by over-burdening the pupils; secondly, by over-specializing the instruction. It is noted that with the rapid increase in numbers of the Gymnasia, and the necessary employment of many young and inexperienced teachers, the home tasks and preparation expected from children, are such as to over-burden their brains, and leave no time for wholesome exercise or recreation. This is the case not only in Saxony, but all over Germany, where the pernicious law which shortens military service to those who successfully pass an examination is in force. Every stupid boy is killing himself that he may escape the three years' service as a private (or whatever the amount is).

The manifesto does not, however, touch on the evil of over multiplying *subjects*, which in England is no doubt more prevalent and poisonous than the over-multiplying of the hours of work; for even where the former does not, as a natural result, produce the latter, it does great and irreparable mischief. I need only point to the two hours a week in French or German at many schools, which fatigue the boy without any return save that of deceiving his parents, and, if he is very silly, even himself.

The second evil noted is the over-specializing of classical teaching, especially in the direction of theoretical syntax. The researches into the constructions of special authors, and the speculations on the logical use of particles, which have so deeply infected the modern grammars, encourage teachers of what they call at Cambridge "pure classics" (?) to set exercises which afford a mere series of syntactical problems, and no practice in turning the natural idioms of one tongue into those of another. The minute of the minister insists that no learning off by heart of syntactical rules will ever teach a pupil the free and actual

handling of a foreign tongue. The present school is described as teaching "an abstract and subtle *dogmatik*," which destroys all the pupil's enjoyment in the great literature of the past.

But while the German state critic fears that each section of classical study may be driven too far by the specialists, and so rendered too minute and various for any ordinary pupil's comprehension, the danger of history or archæology being neglected does not strike him as pressing. In our schools we must rather watch that the exclusive teaching of grammar and composition does not extrude altogether the human and practical, nay even the æsthetic, side of classics; for we have frequent specimens of men who are formally elegant scholars, and who shudder at a false tense or a false quantity, but are at the same time mere children in questions of history or literary criticism, and borrow their opinions from the nearest authority.

The whole document is of great importance, and the meeting by the rectors to discuss it will no doubt be of the highest interest.

J. P. MAHAFFY, in the *Athenæum*.

RECENT EVENTS.

The Faculty of Applied Science of McGill University.—About ten years have elapsed since the organization of the Engineering School of McGill University as a Faculty of Applied Science. In that time it has steadily advanced in its number of students and means and appliances of education. At the recent meeting of the Corporation of the University it was announced that the number of students had reached fifty-one. Of these the greater part are in the course of Civil Engineering, but the proportion taking the courses of Mining Engineering, Mechanical Engineering and Practical Chemistry is increasing. In all these professions the graduates of the school appear readily to find employment, and several of them have risen to important positions.

Protestant Board of School Commissioners.—The monthly meeting of this Board was held on the 16th November. The reports of school attendance for October were laid on the table, showing a total enrolment of 3,631 pupils, of whom 3,369, nearly 93 per cent., were in daily attendance. Mr. G. W. Stephens, M.P.P. was requested to preside at the Teachers' Conference to be held on the 7th of December. A draft of amended regulations and of limit-tables dividing the common school curriculum into seven years instead of six, was submitted by a Committee. The scheme was approved in principle, but detailed examinations were deferred

until the resources of the Board become more nearly adequate to its work. To secure, if possible, some temporary relief, the Rev. Dr. Norman was requested to wait upon the Finance Committee of the City Council, and ask a slight change in the mode of paying the School-tax over to the School Boards. The Rev. Canon Norman and the Rev. Dr. Jenkins were instructed to wait on the Hon. J. A. Mousseau, and to explain to him the circumstances and the needs of Protestant education in Montreal.

McGill University Gazette.—We are glad to see that the students of McGill University have started the *Gazette* again. Its reissue is a sign that the *alma mater* has taken a new lease of life. The editorial committee is composed of two members from each of the faculties, under the presidency of Professor Moyse. The first number is well up to the mark and contains, among other contributions from outsiders, an humorous paper from the pen of one of our lady teachers, with whose insinuating style our own readers are by this time probably familiar. We can only add that we wish the *University Gazette* plenty of subscribers and—contributors.

MISCELLANEOUS.

Oxford and Cambridge.—The two Universities are unlike anything else in the world, and they are very like one another. Nevertheless they have their points of dissimilarity. One such point, in particular, cannot fail to arrest notice. Both Universities have told powerfully upon the mind and life of the nation. But the University of Oxford, of which I am a member, and to which I am deeply and affectionately attached, has produced great men, indeed, but has above all been the source or the centre of great movements. We will not now go back to the middle ages; we will keep within the range of which is called modern history. Within this range, we have the great movements of Royalism, Wesleyanism, Tractarianism, Ritualism, all of them having their source or their centre in Oxford. You (at Cambridge) have nothing of the kind. The movement taking its name from Charles Simeon, is far, far less considerable, than the movement taking its name from John Wesley. The movement attempted by the Latitude men in the seventeenth century, is next to nothing as a movement; the men are everything. And this is, in truth, your great, your surpassing, distinction: not your movements, but your men. From Bacon to Byron, what a splendid roll of great names you can point to! We, at Oxford, can show nothing equal to it. Yours is the University, not of great movements, but of great men. Our experience at Oxford disposes us, perhaps, to treat movements, whether our own, or extraneous movements such as the present movement for revolutionizing education, with too much respect.

That disposition finds a corrective here. Masses make movements, individuals explode them. On mankind, in the mass, a movement, once started, is apt to impose itself by routine; it is through the insight, the independence, the self-confidence of powerful single minds that its yoke is shaken off.—*Matthew Arnold.*

Professor Seeley on History.—Considering man as in the presence of a great Necessity, theology inquires how his ideals may be conformed to it. The Bible is a great history of the dealings of a certain human group with this Necessity, of their attempts to obey it, of their fits of disobedience and forgetfulness. This is the proper historical point of view, which must be taken up in modern history also if it is to become a source of serious instruction, to have its canonical books, or to cease to be the Babel of national brawls and mendacious party recriminations that it is. The remedy lies in regarding history with more reverence, as a main-part of religion; only thus can we save it from the unprincipled perversion it now suffers at the hands of party-writers; the remedy lies, too, in seeing, as the Hebrews did, not only the struggles of men in history but the decrees of a superior Necessity, for history is a source of wild delusions, of the mania of admiration in reactionaries, and of the frenzy of hatred in revolutionists, to those who see in it only human free-will.—*Natural Religion.*

The Endowment of Research at Edinburgh.—"Endowment of Research," though still ignored at the older Universities of Oxford and Cambridge, is being recognised elsewhere. Owens College, by the munificence of an anonymous benefactor, led the way last year; and now the University of Edinburgh is enabled to follow, thanks to another private benefactor, who likewise desires to conceal his name. Five fellowships of £100 each, tenable for one year, but renewable for one or more further years, will be awarded at Edinburgh in October. There will be no examination, but the Senatus Academicus will consider only the qualifications and circumstances of the candidates. The fellowships are intended for persons having attained some proficiency in, and who are desirous to prosecute, unprofessional study and research in one of the following subjects:—Mathematics (pure or applied), or experimental, physics, chemistry, biology, mental philosophy, history, or the history of literature. They are open to any graduate of a Scottish university not being more than thirty years of age at the date of application, and provided that he be not an assistant to any professor, or an examiner in any department. Each fellow will be expected to reside in Edinburgh during the winter and summer seasons of the university (1882-83) to prosecute his particular branch of study under the advice of the professor to whose department the subject belongs; and within a year after his election to give evi-

dence of his progress by the preparation of a thesis, the completion of a research, the delivery of a lecture, or in some other way approved by the Senatus Academicus.—*The Academy.*

Smattering and Grounding.—It is hard to find anything new in speeches on education, but there is one passage in Sir John Lubbock's address at Bedford, containing a thought which, if not absolutely new, is yet sufficiently unrecognized to need a good deal of preaching. Speaking of the common objection to boys learning a variety of subjects, he said that he thought it arose "from a confusion between a smattering and a grounding in a subject." The distinction is one which greatly needs being insisted upon. The business of education, one is often told, is not to fill the mind but to train it. True enough; but training ought at the same time to give the boy the means of filling it himself, to open the doors, as it were, of various branches of study. In the treasure-house of knowledge there are many chambers, and each has its separate key in addition to that which opens the front door. Education should give us possession of as many of these keys as possible. How many each man can be safely entrusted with, it may not be easy to decide, but it is wrong to lay down too strict rules to limit the number. To learn the rudiments of several sciences, though it may be rashly denounced as "smattering," is a very different thing from that really injurious superficiality which consists in acquiring the common places of all.—*Pall Mall Budget.*

Grammatical Laws.—Words, or rather the arrangement of words, are certainly subject to laws, but the great difficulty of grammar is that these laws are so indefinite. And, instead of calling the rules of grammar natural laws, we should say that they are from first to last perfectly arbitrary, the rather clumsy invention of grammarians who are trying to reduce to rule a state of things which they do not quite know how to account for. If there be any analogy between grammar and any kind of law, it must be Common Law, which translates use and custom into legal right. If the laws of nature are infringed, we can confidently assert that some definite result will follow; but, if an ignorant person in speaking or writing sets all the laws of grammar at defiance, he yet succeeds in making himself perfectly intelligible to the person he is speaking or writing to. In short, the so-called laws of grammar are, strictly speaking, very much on a par with the laws of politeness; they can only tell us what are the modes of expression that will pass muster among educated people in the present day. For grammarians ought to remember that many phrases which were accepted in polite society a century ago, would now be scouted as ungrammatical. Again, there is no reason, still less law, why one word should become obsolete and another should hold its ground. Why, for instance, should

the word "to-day" be good grammar, and the equivalent expressions "to-week," "to-month," "to-year," still current in some parts of the country, be bad grammar? And numberless similar examples could be cited. The fact is that when once the ear is accustomed to a certain turn of words, any deviation from that jars upon it and is pronounced as incorrect. The phrase that has once found its way into the every-day talk of well-bred persons next finds its way into grammars, and grammarians have to invent some new rule to account for it.—*Saturday Review.*

The "Scott" Question in Liverpool.—There has been an animated discussion at the Liverpool School Board as to whether novels should be admitted as part of the school course, and by a majority of one this question has been decided in the affirmative. The battle was fought over "Ivanhoe," and the children of Liverpool will at once make acquaintance with Rebecca and Rowena, and probably Thackeray's version with Mr. Doyle's illustrations will be read in small doses by the lower classes. The caricatures and misrepresentation in "Ivanhoe" of the Catholic Church, the distaste for more serious and interesting work produced by novel reading, were weighed in the balance against the recommendation of her Majesty's Inspector, the elevating effect of novel reading on the mind, and the suggestion that good novels might keep the children from the piratical penny novelette, and were found wanting.—*Pall Mall Budget.*

SCIENTIFIC JOTTINGS.

Two scientific men of note have recently passed away—Prof. Francis Maitland Balfour, of the University of Cambridge, and Dr. George Dickie, Professor of Botany, of the University of Aberdeen. Prof. Balfour lost his life whilst attempting the passage of the Aiguille Blanche de Penteret, one of the buttresses of Mont Blanc, in Switzerland. He was quite a young man, but yet had done a large amount of valuable original work, and was the author of a valuable work on the "Development of the Elasmobranch Fishes." He is best known, however, by his work on "Comparative Embryology." Dr. Dickie was the author of numerous papers and several books on botanical subjects, and was especially interested in the study of the Algæ.

Certain members of the British Association for the Advancement of Science have been putting on record their opinion that there is no conflict between science and religion. A manifesto drawn up by members of the Association has received no fewer than six hundred and seventeen signatures of scientists, "many of whom are investigators of the highest eminence," and "almost all are fellows or members of learned societies." "The manifesto," says an exchange, "declares positively that to cast doubt upon the revelation of Scripture is a perversion of science and that the testimony for God in Nature and that which is given in the Bible may differ, but do not contradict one another."