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JOHN SEATH, B.A., INSPECTOR OF HIGH SCHOOLS.

MR. SEATH was born in Auchtermuchty, Fifeshire, Scotland, in 1844. His parents removed in 1847 to Monaghan, Ireland, and he received his preliminary education at Corlett School in that town. He matriculated at Glasgow University in 1858, attended one session, and completed the Arts course at Queen's College, Belfast. During his course at the last named institution, Mr. Seath stood first in Natural Science, taking prizes in that and other departments of study. He also took Honors in General Proficiency, in 1861, his final year, and graduated from Queen's University in his seventeenth year, standing first in Natural Science, and winning the Gold Medal and Exhibition in that department. Had he returned to his College after graduation, he would, no doubt, have been Senior Scholar in Natural Science. But he then, in 1861, sailed for Canada, whither the family had preceded him some time before.

In January, 1862, Mr. Seath was appointed Headmaster of the Brampton High School. This position he retained for seven years. In 1869, he became Headmaster of the Oshawa High School, in 1871, of the Dundas High School, and in 1874, of the St. Catharines Collegiate Institute. The last named position he retained till August, 1884, when he was appointed by the Minister of Education to his present position of Inspector of High Schools.

Of Mr. Seath's work as High School Principal we have not space to speak particularly. It was, so far as we have learned, very successful in each locality. It would be easy to furnish a goodly list of such men as Rev. John Somerville, of Owen Sound ;

Dr. Arnott, of London; Dr. A. R. Robinson, of New York; the late Dr. McCollum, of Jarvis Street, Toronto; Principal L. E. Empree, of Parkdale, etc., each of whom would readily, we have no doubt, ascribe no inconsiderable measure of his success, to the mental impulse, direction and stimulus received while under Mr. Seath's instruction. Perhaps a still better tribute to his ability and faithfulness as teacher and principal is the fact that his appointment to his present office was highly approved by the High School teachers of Ontario, who readily acknowledged, as one of them assures us, Mr. Seath to be "the leading High School

for Mathematics, during his inspectorship, that Mr. Seath has done for English and Science. In the methods of teaching the former he has wrought a revolution. His first examination papers in English raised a cry of disappointment and protest from many teachers and candidates, but those papers demanded methods of teaching the subject which are now carried out by the best teachers of English in our schools, and it is not too much to say that in no other country is the subject of English taught more scientifically in secondary schools than in the Province of Ontario to-day. It may be said, too, that efficient science-teaching dates from Mr. Seath's

appointment. The results of his vigorous administration are to be seen in the fitting up and equipment of special science-rooms for practical work by the pupils in Chemistry and Physics, and in the greatly improved status of the science-masters. Not only Chemistry and Physics, but Botany and Zoology are now taught by observation and experience, and the Universities have recognized the ability of the schools to cope with this work, by accepting Science in lieu of French or German at matriculation. Further proof of the increasing importance of this department is to be found in the formation of a Science Teacher's Association, quite as vigorous as any of the other bodies organized in the interests of Classics, Mathematics, and Modern Languages.

As an Inspector, he is honest and fearless. Though he is firm and unyielding where a principle is at stake or where strict discipline is necessary, no teacher who is trying to do his best need fear his criticism or his censure. He has the faculty of seeing at a glance the *morale* of the class room. In departmental work, his mastery of the details of the High School system, and his well-developed faculty for organization have made his advice of great value, and it is well understood that in bringing order out of the chaos in which

Mr. Ross found the Department when he took charge, the Minister has had a most valuable coadjutor in Mr. Seath. Mr. Seath visited the schools of New England and New York about two years ago, and prepared a very valuable paper on these schools, with suggestions. This paper was published in the Minister's Annual Report. Mr. Seath's edition of some extracts from Milton and his excellent High School Grammar are well-known to our readers.



JOHN SEATH, B.A., INSPECTOR OF HIGH SCHOOLS.

Master—the *dux* of the profession—in the Province.

Mr. Seath's work as Inspector has been characterized by the same energy and strong common sense which marked his administration of the schools in which he was Headmaster. Without neglecting any department of High School study, he gave special attention, as indeed he was instructed to do, to those of Science and English, till then much neglected. What Dr. McLennan did

* Special Papers. *

MY WINTER CLASS.

BY FRED. BROWNSCOMBE, PETROLRA.

By my winter class I mean those pupils, mostly boys, who attend school for the months of January, February and March only, being required at home the rest of the year.

When I began teaching I rather dreaded this class as a disturbing element in the school, a sort of "invasion of the Vandals." Here are a number of boys from fourteen to seventeen years of age, who have been in the fields or woods for nine months and who, having been under no discipline there, will find it irksome at school. They are at a troublesome age, the age when they imagine themselves to be men and ape the ways and manners of men. Consequently they are apt to consider the school somewhat beneath them and to show a reluctance to enter into certain parts of the school programme. Besides this, many come with a deeply-grounded prejudice against certain subjects; so much so, that if they do not decidedly object to study them, they will exhibit such an indifference to the objectionable work as will make it a hopeless task to endeavor to carry it on. I think that I am here stating an experience common to nearly all rural teachers.

With this class then, how are we to proceed that they may obtain the greatest possible benefit from their three months schooling? The first essential is the co-operation of parents and pupils. To gain this, I call upon the parents at the beginning of the term for the purpose of describing my plans and shewing them that I am making a special effort for these boys and giving them work directly in line with their business. To these pupils I speak in a similar vein. I endeavor to converse with them individually, to have them feel that I am really interested in their progress; then a friendly feeling being established, the work will proceed rapidly and without friction.

I intimated before that this class at first was scarcely my favorite, but now it is the one I find most pleasure in teaching. For, in the ordinary classes, there is a good deal of monotony and a considerable amount of cram, and the teacher is hedged in by programmes and examinations till all free choice is crushed and his originality is given little scope for exercise. But with this class it is different. Within certain bounds, the teacher is completely free. Having no examinations (that is, excepting his own monthlies) to prepare for, he may linger where he is enthusiastic and pass more quickly where he feels less interest. He may wander fearlessly from the beaten path and, indeed, I think a considerable deviation from the ordinary programme necessary.

But in what follows I do not presume to lay down the course for this class. Not by any means. I give it merely as a sample. Each teacher must arrange his work to suit himself and his class.

Now to begin my course. On Reading, which I suppose comes first, I have no

suggestions to offer, except that for the sake of variety, the class occasionally read from some book or paper other than their textbook.

In writing I make no change, this class, as the others, writing alternately on copy-books and on scribblers. The work on the scribblers is to give special training in free-hand writing. On them the school frequently practise ovals, connected small letters, connected capitals, and various combinations of letters. This is a pleasurable change from the monotony of the copybooks, and it is only in some such way as this that pupils will acquire the muscular movement in writing.

After reading and writing of course comes Arithmetic. It consists entirely of farm arithmetic and practical mensuration. After a brief review of fractions and measures, we begin at the woodpile, taking it practically. The class measure the wood at the school, find number of cords and value, find how many cords the woodshed will contain, find how high the wood must be piled on a sleigh of say 12 feet long to contain say $2\frac{1}{4}$ cords, etc.

When the wood-pile is pretty well exhausted, the class turn to the lumber yard, and here I might remark, that before dealing with such things as lumber, plastering, shingling, papering, etc., half-hour talks with persons interested in these will aid one much more than the study of a textbook. For it is as true of this subject as of any other, that, as an eminent writer says, text-books are always at least ten years behind the times.

After discussing lumber measure, with exercises on boards, planks, scantlings, etc., the class apply their knowledge to fencing. By actual measurement they determine the quantity of lumber required for the school, and its cost, including posts. Other kinds of fences are introduced; close board fences; picket fences, with baseboards; barbed wire fences at so much a pound of so many feet, etc., stringers and posts being taken into account in each case.

Fencing is followed by carpenter's work. The class find how many feet of lumber in the flooring of the school, the wainscoting, the sills, the walls, the sheeting of the roof, the platform, the sidewalk; the cost of these, and the cost of the moulding, the doors, the window sashes, etc. Then such problems as the following are given:

A barn is 60 feet long, 40 feet wide, and 20 feet high; the gables are 8 feet high and the rafters are 21 feet long.

Find the number of feet of inch boards in the two sides, allowing for four double doors 12 feet by 16 feet.

Find the number of feet in the ends and gables.

Find the number of feet required to sheet the roof.

Find the cost of the matched lumber for the doors at \$18 per thousand.

How many feet of two inch plank are required for the floor 24 feet wide?

How many feet of lumber are there in the sills 10 inches square?

How many feet of lumber are there in the 12 posts of the barn if they are 8 inches square?

If the rafters are 4 inches by 4 inches,

and are placed 2 feet 6 inches apart, what is their value at \$10 per thousand?

At this time, owing to the gables, it is necessary to teach how to find the area of a triangle—an easy matter.

Then the class work at shingling, finding the cost of shingles for the school shed, their barns, etc.

Land is next dealt with in various exercises, and here I teach square root, applying it to the solution of numerous problems on land such as, "How many 12 foot rails are needed for a straight rail fence 6 rails high, around a square ten-acre field, the rails overlapping one foot?"

After this, one may or not take laths, plaster, paper, carpets, paint; and brick-work and stonework for walls, basements, and houses. In all of these I think ordinary business methods should be used, not antiquated or round about ways. For instance, in finding how much wood in a pile say 12 feet long, 8 high and 4 wide, instead of multiplying 12 by 8 and the product by 4 and then dividing by 128, why not say, as the man who sells you wood will, that it is $1\frac{1}{2}$ cords long, 2 high and 1 wide, that is, 3 cords?

Then come parallelograms, triangles, circles, and the cylinder, the problems in every case being of a practical nature.

The last division of this subject is per cent, and interest, simple and compound.

A few other useful things are taken with the class, such as the fact that a bushel contains $1\frac{1}{2}$ cubic feet, which enables them to ascertain what amount any bin will hold.

As to the order observed in the preceding, it is purely arbitrary, though I have found it as suitable as any other. Again it contains material for two winter's work for most classes.

I now turn to a subject to be quickly disposed of, a subject which many desire to see abolished in the Public Schools—I mean Grammar. I do not set the dry husks of technical grammar before this class. I think that with them it would be a waste of time—a limited time which may better be devoted to other subjects of more utility and of quite as great disciplinary value. Its place is taken by exercises in practical grammar and business correspondence, which alternate on the time table with composition.

The practical grammar consists of exercises on the singular and plural number, on the possessive case, on comparison, and on voice and tense, together with the corrections of such mistakes as I notice the pupils actually make.

In the business correspondence is included receipts, promissory notes, orders, due bills, bills of account, etc., and all kinds of business letters and business writing. Here are a few examples: Order from the Grip Publishing Co., certain books, enclosing P. O. order for amount; send your subscription to one of the newspapers; write your teacher asking a letter of recommendation etc. Have the class answer advertisements of various kinds directly from newspapers given them; have them write advertisements of farms for sale, etc. Upon all the above and upon letter writing generally I give pretty thorough instructions, using as

examples of form, folding, address etc., some letters from the host which every teacher receives from firms desiring agents, etc. In addition to this I discuss the various ways of remitting money, rates of postage, the sending of cards, books, parcels, etc. by post or express.

In composition I avoid all merely technical work, my aim being to give the pupil plenty of practice in expressing his thoughts in written language, to which end the class frequently compose stories, at first from outlines on the blackboard, but after a time, writing them from given titles only, without further suggestion. Dozens of subjects will suggest themselves to the teacher, as "A Runaway Team," "A Brave Dog," "How John Lost His Dinner," "A Balloon Excursion," etc. In these stories certain principles are to be followed; the stories must mention date and place, and must contain comparatively full descriptions of the characters. Later on they must devote some considerable space to scenic description, at which time I occasionally read by way of example portions of chapters from novels.

Another class of work in this line, which besides cultivates exactness and closeness of observation, consists of having the pupil write descriptions of the school, his church, his farm, games of different kinds, etc.

At other times the class write speeches for the chairman of our bi-weekly entertainments, the best ones being delivered on those occasions.

Again I sometimes relate things to the class for reproduction; usually heroic or romantic incidents from history, biographies, and once in a while legends, such as the old Greek tales of Perseus, the Search for the Golden Fleece, tales of Troy, etc., which they seem to enjoy very much.

Other work occasionally given is the rearrangement in several different ways of given sentences; the changing of statements into exclamatory or interrogative sentences; the expansion or contraction of given passages; and paraphrasing.

Here I may mention an exercise, scarcely composition, but conveniently taken with it, which I give frequently, and to which I attach much importance, namely, that of determining the subjects of specified paragraphs of prose, or stanzas of poetry, usually from the Reader. The object of this is to aid the pupil to acquire the power of grasping at once the ideas contained in whatever he may read.

A subject treated much like grammar, is English History. It appears only in biographies, and in descriptions of manners and customs, prepared by the pupils for the Composition class.

But Canadian History is not slighted; it is given considerable attention. As the rural schools open within a few days of the municipal elections, a good starting point is afforded, namely, the municipal system. A thorough discussion of this is followed by a similar treatment of the school system, the judicial system, and the parliamentary system. In the course of this, there are obtained from the class, usually as homework, the names of the members of the township council, the County warden, the school trustees, county judges, the sheriff, the

members from the county of the Local Legislature and of the Dominion Parliament, and of the Cabinet ministers.

The investigation of the parliamentary system naturally leads to a consideration of the British North America Act. It is accordingly dealt with, and the rest of the course consists of the history of events from that time to the present. As this is all within the memory of the parents of these pupils it may be made something more than mere text-book history. What time remains after the above, I occupy with any topic which I may find most interesting at the time. A favorite is the war of 1812. Than this no better lesson can be given in patriotism (by patriotism I do not mean hatred of the United States). Any other topic would do, and the teaching of such as the Exploration of the Great West, the Indian Wars, or the Conquest of Canada, becomes a positive delight after reading Parkman.

While discussing history I must not omit current or newspaper history. If the newspaper is, and there is no doubt that it is, a great factor in education in the broad sense of the term, we should make use of it. Is it not true that the after education of many of our pupils will be obtained almost entirely from the newspapers. Then, as our aim is not merely to cram the pupil's mind with information, but to prepare him for further self-education, I think we should try to aid him towards making the best use of the newspaper, to have him read the useful and elevating, and avoid the trash and worse, so much of which appears in the papers.

In this current history I have tried several plans. For a time I wrote on the blackboard every morning, several news items, requiring the class to copy and be prepared to discuss on Friday. Again, the pupils in turn did this, I bringing papers to school and giving them such aid as was necessary. My present plan is to give three or four questions every evening as homework. In this, one is not limited to news only, but may give with it thought-arousing questions on various other things.

Names of farm implements, common objects, words used in ordinary conversation, etc., such as may be found in Gage's Speller, together with short sentences containing *their* and *there*; *now*, *know* and *no*, etc., constitute the spelling course.

For Dictation I read, or have read, passages from the Reader, mostly those containing dialogues, the class to write and supply themselves the quotation and other marks. This is more for the purpose of habituating the class to proper punctuation than as a dictation exercise.

In Literature, I select three or four authors and from their works exclusively, embracing all of them that appear in the Reader, this class have literature lessons. Those dealt with last winter were Longfellow and Tennyson only. In the study of these two, I had the whole school take part, selections from their works being found in the Fourth, Third, and Second Readers, and one of Tennyson's having a place in even the First Reader.

Let me describe my treatment of, say, this last author. I strive to make "Tennyson" more than a mere name to the pupils,

to get them to take a real interest in the man and his works. To this end I give as graphic accounts as I can of his life, his home, and his surroundings, together with a number of anecdotes about him. (The newspapers supply the material for this). Also, his picture is brought to the school. Then again, other departments of work are, whenever possible, brought into connection, so that the school becomes quite thoroughly "Tennysonian." The "memory gems" for the time are selected from the author under discussion. While the class study as literature one of his poems, they have as a reading lesson another, and occasionally they read in class one not in the Reader. In composition, stories for re-production are taken from Tennyson. These I partly read, partly relate, such as "The Princess," "Enoch Arden," and, from the "Idylls of the King," "Enid," "Gareth and Synette," "The Passing of Arthur," etc. Besides this, I have the pupils read for themselves from a volume of Tennyson.

During this time the third class have as literature and reading the four selections from this writer in the Third Reader, and the first and second classes learn the two pieces in their readers.

Then we close our study by a Tennyson Day, in which all the songs, readings, and recitations are from Tennyson, interspersed at appropriate intervals with anecdotes of the poet, an account of his life, some description of his characteristics as an author, quotations from him and quotations about him, a list of his chief works, etc. In this, every pupil can take some part.

In Geography the course consists of the commercial geography of the world, and the study of either Canada, Great Britain, or the United States. In the first mentioned the subjects handled are, the products and exports of the various countries of the world (taken in groups); the great trade routes, the chief steamboat lines, ocean cables and their telegraph connections; and a list of forty or fifty of the more noted commercial cities of the world, mentioning of course for what each is noted.

The newspaper serves very largely as a guide in geography. A year ago I paid considerable attention to Africa, owing to the great interest taken in Stanley just then. The Brazilian revolution was the occasion of several lessons on Brazil, and so on. It is wise, I think, to get the pupil in the way of giving some attention to other things than merely those of his own narrow sphere; to plant in him the seeds of interest in the great world-problems occupying men's minds.

Another thing I have tried with this class was a series of easy experiments in Physics. No costly apparatus is required; with a jack-knife and the co-operation of his pupils, one has all that is necessary. These experiments occupied about ten minutes, or sometimes fifteen every morning. Besides the ordinary objects of science teaching I had in view the making of this, the beginning of the day, attractive enough to prevent any tardiness.

Lastly, I have put agriculture. I have no remarks to make upon it, except that I think this class is the only one with which it has any business in the Public School.

* English. *

Edited by F. H. Sykes, M.A., to whom communications respecting the English Department should be sent.

SHAKSPERE OR ?

I HAVE been puzzled somewhat to know how I should—ought to—write the name of our great dramatist. As a boy I was quite content with "Shakespeare"; when I read Dowden and Furnivall, I began to like "Shakspeare." Extending my reading to late seventeenth century texts, a certain fondness for "Shakespear" began to show itself, while a glance at the title-page of a certain sixteenth century quarto threatened to banish all other orthographies in favor of "Shake-speare." Is there any true and settled orthography of the poet's name?

The direct evidence in the case is very slight. Only five admittedly genuine signatures of the poet exist—three on his will, two on deeds. The signatures of the will may be seen in fac-simile in R. G. White's *Shakespeare*. The will itself has been reproduced, fortunately for our inquiry, by photographic process, and may be examined in the "Jahrbuch" for 1889, of the German Shakespeare Society. It is in three sheets, each of which is signed by the poet himself. The signature on the lower left hand side is unfortunately almost obliterated, but when examined by Malone in the last century it was pronounced to be "Shakspeare." The signature at the foot of the second sheet is likewise "Shakspeare," though the final letters are hard to decipher. The last and main signature has usually been thought "by me William Shakespeare." The hand that wrote it is tremulous and uncertain, the letters from *p* on are scarcely distinguishable from one another. Of late, however, it has been seriously doubted whether the ordinary reading is correct, and I am disposed to accept the finding of Sir F. Madden, that all the signatures of the will, as well as the mortgage deed and deed of bargain and sale, are "Shakspeare."

That is our testimony from S—?'s own hand. Were it all the testimony we have, there could be no doubt about the correctness of the orthography. But there is a mass of indirect testimony that makes doubt possible.

Our poet must have signed his name thousands of times, yet we have but five signatures. Was he uniform and consistent always? Were people of the time uniform and consistent? Mr. Halliwell Phillipps has pointed out that Lord Dudley's signature was generally "Duddeley," while his wife signed "Duddley," and a relative, "Dudley." Ben Jonson appears "Jonson," "Jhonson," "Johnson"; Sir Walter Raleigh, "Raleigh," "Rauley," "Rauleigh," "Rowlegh," "Rawley." The writer referred to has gathered from the families of the poet's name in and about Warwickshire (1450-1650) fifty-eight varieties of spelling, from "Chacsper" to "Shakyspar," evidence enough to show us that the writing of names was a matter of taste and fancy even with the best educated. Was it so with the poet's own family and himself?

Signatures from the poet's father and sisters we have none; his brother Gilbert signed himself "Shakespeare." In the complaint of John S—?, the poet's father, against John Lambert respecting an estate near Stratford, the scribe has written four times "Shakspeare," nine times "Shackespere," once "Shackespere," and once "Shackspeare." In the fine levied upon New Place when sold by William Underhill to the poet (1597), "Shakespeare" occurs five times, and in a second fine (1602) that spelling is repeated. In the license issued by James I. to certain comedians (May 17, 1603), among the number we find "William Shakespeare."

Turning to the published works of the poet, we find much of interest. "Lucrece" and "Venus and Adonis" were without a doubt issued under the author's supervision, and on each of these the name of "William Shakespeare" is found. The various quarto editions of his separate plays published during his life-time were "pirated" and cannot be taken as evidence, except to show the style of spelling generally favored by the printers of his day. Examination of the title-pages of the folios is made possible for us in America by the heliotype reproductions of Messrs. Osgood & Co., Boston. Of the fifty-five title-pages of quartos found in their

volume, fifteen do not contain the author's name, fifteen have "Shake-speare," twenty-one Shakespeare, one has "Shak-speare," one "Shakespere," one "W. Sh.," one is doubtful "Shake-speare" (the hyphen coming at the end of a line). In the first folio edition of 1623, issued after the poet's death by his friends and fellow actors Heminge and Condell (fac-simile ed. of Chatto and Windus), the title-page reads "Shakespeare," and turning to the editor's dedication, we read that the edition is "to keepe the memory of so worthy a Friend and Fellow alive,—as was our *Shakespeare*." Facing the portrait of the great dramatist, we find Ben Jonson's lines to the reader.

"This Figure, that thou here seest put,
It was for gentle *Shakespeare* cut;
Wherein the graver had a strife
With Nature to out-do the life:
O, could he but have drawne his wit
As well in brasse, as he hath hit
His face, the Print would then surpass
All that was ever writ in brasse.
But, since he cannot, Reader, looke
Not on his Picture but his Booke."

In the folio of 1632 we find "Shakespeare," while in those of 1664 and 1685 we find "Mr. William Shakespear."

There is only one other point that needs here to be touched on. Etymology may have some slight bearing on the question. The received etymology may be taken as stated in these almost contemporary lines:

"The race
Of Shakespeare's minde and manners brightly shines
In his well turned and true-filed lines:
In each of which, he seems to *shake a lance*,
As brandish't at the eyes of Ignorance."

Camden, whose book was published in 1605, gives us authority enough to discard the various other suggested derivations, Jacques-Pierre, Sigisbert, Schachsburh, etc. (v. C. M. Ingleby's "Shakespeare: The Man and the Book"). He expounds the well-known origin of surnames by saying that such a one is called Palmer because he returns with a palm-branch as sign of his visit to Jerusalem; and so from original characteristics or exploits, etc., we have Longsword, Broad-speare, Breake-speare, Shakespeare, Shot-bold, Wagstaff, etc. This view is maintained as well by Bardsley in his "English Surnames," p. 461. If then we follow the etymology, originally it is true, M. E. *sper* and A. S. *sper*, we must write "speare," for "speare" is undoubtedly the common spelling of the Elizabethan period. We find, for example, in the Folio of 1623, many lines such as:—

"My husband's wrongs on Herford's speare."
Rich. II., I., i., 48.

"If I be gored with Mowbray's speare."
I., iii., 60.

"Thruste Talbot with a Speare into the Back."
Hen. VI., I., i., 138.

"He was thrust in the mouth with a Speare."
II. *Hen. VI.*, IV., vii., 10.

To sum up:—The direct testimony from the poet's hand is for "Shakspeare," but this testimony is far from conclusive, because there was no fixed orthography for proper names during the Elizabethan period. On the other hand, the poet's own publications give "Shakespeare," and this orthography is sustained by the majority of cases in those printed monuments in which the poet is referred to by his contemporaries, and especially by his friends.

"OFT, IN THE STILLY NIGHT."

BY THOMAS MOORE.

I. INTRODUCTORY.

THE poem "Oft in the Stilly Night," is one of a volume of poems published by Moore in 1815, entitled "National Airs." The "air" in the case of this poem was a Scotch one, which musicians know best as arranged by Sir John Stevenson.

II. ANALYTICAL TREATMENT.

(I.) 1. Who is represented in the poem as speaking? What periods of his life are described? [The poet represents in the poem the thoughts of an old man (the poet's own thoughts, if you will) reflecting on his past life.] 2. At what time do these thoughts come to him, and why? [In the silence of night, before he falls asleep. The distractions of the day's occupations are gone. In the silence and

calm of the night the mind is free to wander over the past.] 3. Are these memories of the past pleasing? [In themselves, yes. They are full of joy and brightness, for he speaks of the "light" of other days, shining again around him as these memories gather. He calls this remembrance "Fond memory" to indicate that he loves these memories.] 4. What memories arise in the mind? [The joys ("smiles") and sorrows ("tears") of his boyhood, with the loving words of parents and friends; the comrades, once happy and gay ("eyes that shine"), now dead ("eyes dimmed and gone") or heart-broken.] 5. Why does he now say "sad memory" instead of "fond memory"? (II.) 1. Which of his memories seems to affect him most? 2. What is the real force of "linked" in friends linked together? 3. What is the real force of "like leaves in wintry weather," in describing the death of his friends? 4. What feeling must fill the minds of the aged as they see their friends dying around them? [Compare "'Tis the Last Rose of Summer," especially stanza III.] 5. How is the reference to one

"Who treads alone
Some banquet-hall deserted"

expressive of this feeling?

1. Point out the words in the poem that would not be used in every-day prose. 2. Give the every-day equivalents of these words? 3. Why are the poet's words better than the ordinary prose words? 4. Point out the phrases or clauses that are quite poetical in their nature and give plain prose equivalents. 5. Which do you prefer, and why?

What is common in sentiment to the two poems "Oft in the Stilly Night" and "'Tis the Last Rose of Summer"? 2. What is the common source of this emotion?

For Friday afternoon, if the teacher should devote an hour to Thomas Moore, he will find helpful, "Oft in the Stilly Night," set to music by Stevenson; "The Canadian Boat Song" in "Novello's Musical Times" (223); "The Minstrel Boy" as arranged by Balfe ("University of Toronto Song-book" and elsewhere); "'Tis the Last Rose of Summer" by Flotow (Song Folio), while various poems of Moore are to be found in the "H. S. Reader," "Chambers's Cyclopædia of English Literature," and the "Cabinet of Irish Literature," III. The two last named contain lengthy accounts of Moore's life and work.

III. BIOGRAPHICAL.

(See the preceding lesson.)

F. H. S.

* Question Drawer. *

ENGLISH.

M.M.—The farmer in the "Little Midshipman" is somewhat old-fashioned, uses the "thou" and "thee" in speaking to a child, as once everybody did. Notice that the boy uses the polite and formal "you" to the farmer.

YOUNG TEACHER.—In the sense in which we speak of "Pilgrim's Progress," "Vision of Mirza," etc., as being allegories, Arnold's "Forsaken Mermaid," is not an allegory. Let the poem be studied and felt simply for itself.

J.T.—(1) The "Waverley Novels" take their name from the name of the first novel issued in that famous series—"Waverley." (2) Domeneddio is a contraction of Italian words *domine, dio*, corresponding to the English Lord God.

W.G.M.—For questions (a) and (b) see (c) of answers to "Subscriber." In the "Cloud" (V. R., p. 221) "the mountains its columns be;" "its" refers to "roof." The "Powers of the Air" are the forces of nature manifested in the air—wind, heat, light, etc.

X.Y.Z.—In "They then opened a parley, hoping to gain more advantage," the word "hoping" is adjective to "they," and since it is a participle, it has its object, the infinitive "to gain." Logically it is adverbial to "they opened," being equivalent to "since they hoped to gain," etc. This gerundive character of the participle is not uncommon.

GRAMMAR.—The inflections for person and number for the (a) conditional and (b) potential verb phrases of the active conjugation of "sit" and "freeze" are (c) I should sit, thou wouldst sit (freeze), he would sit (freeze); we should sit (freeze), you would sit (freeze), they would sit (freeze); (b) I may (or can) sit (freeze), in the present tense, [I might or could sit (freeze) in the past tense] thou mayst (canst) sit (freeze), he may (can) sit (freeze); we may (can) sit (freeze), you may (can) sit (freeze), they may (can) sit (freeze).

SUBSCRIBER.—Mary Mapes Dodge (v. III. R.) was born in New York, 1838, married William Dodge, a lawyer of that city. Her early taste for literature was fostered by her associations. In 1865 she published "Hans Brinker, or the Silver Skates," a story of boy life in Holland, which was wonderfully popular. Its success secured for its author the position of editor of the best of magazines for the young, *St. Nicholas*. Mrs. Dodge is a leading figure in New York literary circles. "A Few Friends," "Along the Way" (poems), "Donald and Dorothy," etc. are by the same author.

CITY.—The fourth stanza of "Boadicea" is difficult. We take it that the Druid's meaning is not literal but figurative. He says first that Rome shall fall; then, that her fall is made certain because of the massacres among conquered peoples. The blood of those she has slain cries for vengeance, and soon this vengeance will fall, hence her doom is certain. She will perish abhorred by the world—a fall as deep as her crimes have been great. I do not think we should take "write...spilt" literally, but simply as a strong assertion, just as we say, "His doom is written in letters of fire," to mean a startling, inevitable, evident doom.

CITY.—By the "central unity" of any work of art, is meant simply that the poem or picture contains a chief idea, around which each incident or part is grouped. In "Boadicea," for example, the poet wishes to describe the tragic end of the British queen. Such is the central idea of his poem, for you will notice, each part helps to develop that subject; (a) her humiliation by the Romans; (b) her consulting of her national gods, and the Druid's answer to her appeal; (c) her determination of vengeance; (d) her death. In art we find the same thing. For example, in Murillo's "Moses Striking the Rock," the central idea is the assuaging of thirst. We see that all the figures in the picture, old man and infant, camel and dog, in some way or other illustrate this idea. For some are eagerly drinking, others handing water to those behind, children stretching their hands entreatingly towards the stream, the dog lapping the flowing water, the crowd pressing forward, etc., while, rod in hand, the central figure, Moses, is looking praises to God beside the riven rock. Every detail therefore contributed to the essential meaning of the piece, to a "centre unity."

W. E. M.—The analysis of the passages sent is:

(a) "Yet bury him here where around him
You honor your bravest that fall."
iv. R., 287.

The subject is "ye" (understood), the predicate is "bury," the object of the verb is "him," the extension is the adverbial clause "where fall." "Around" is a preposition forming with "him" an adverbial phrase of place modifying "honor."

(b) "Let my heart be still a moment." v. R., p. 259.

"Let" in such a sentence as this has lost its original independent verbal force, and is a mere form of the imperative verb phrase; we might say here without changing the meaning, "Be my heart still a moment." At the same time it is verb enough to require its object, as for instance, "Let him be happy." Hence the analysis: the subject, "thou" or "ye" (understood), predicate "let," object "my heart," completion of the predicate, "be happy," adverbial complement of time, "a moment." This is formal and unsatisfactory. As a matter of fact the phrase "let be" is a periphrasis for the imperative "be" in which "my heart" is grammatically an object, although in sense a subject.

"Let" cannot, as you suggest, be the subject.

(Continued on page 541.)

Mathematics.

All communications intended for this department should be sent before the 20th of each month to C. Clarkson, B. A., Seaforth, Ont.

EDUCATION DEPARTMENT, ONTARIO — ANNUAL EXAMINATIONS, 1891.

ARITHMETIC AND MENSURATION.

JUNIOR LEAVING AND PASS MATRICULATION.

Examiners: { A. R. BAIN, LL.D.
N. F. DUPUIS, M.A.,
I. E. MARTIN, B.A.

NOTE.—Candidates for Junior Matriculation must take section A, and any four questions in section B. Candidates for the Junior Leaving Examination must take questions 4 and 5 in section A, any four questions in section B, and any three questions in section C.

A.

1. (a) How can you determine, by inspection, when a number is divisible by 5, 9?

(b) State and illustrate the proof of Multiplication by casting out the nines.

(c) Find the value correct to four decimal places, of:—

$$2 + \frac{1}{1 \times 2} + \frac{1}{1 \times 2 \times 3} + \frac{1}{1 \times 2 \times 3 \times 4} + \frac{1}{1 \times 2 \times 3 \times 4 \times 5} + \frac{1}{1 \times 2 \times 3 \times 4 \times 5 \times 6}$$

2. Distinguish between prime and composite numbers. Resolve the composite number 277200 into its prime factors and by this process find the greatest common measure of 1071, 1092, 2310.

3. The actual cost of making a piano is \$256. The manufacturer, importer and local agent each make 25% profit. For what amount does the agent sell it?

3 One clock strikes 5 strokes in 6 seconds and another strikes 6 strokes in 7 seconds. They strike the 10th stroke of 12 together. If the first clock is correct, what is the error of the second clock when the first clock begins to strike?

5. A speculator is shipping 30 horses, which cost \$160 each, to Liverpool. For how much must he insure them at 1 1/2% so that in case of loss he may recover the cost of the horses, and the premium paid for insurance?

B.

6. Jones bought a house for \$3,000 cash; it is assessed for 3/4 its value, the rate of taxation being 16 1/2 mills on the dollar. The insurance is 3/8% on 3/8 of the cost. If Jones could have loaned his money at 5% what monthly rent is he paying for his house?

7. The expense of constructing a railway is \$5,000,000, of which 40% is borrowed on a mortgage at 6%, and the remainder is held in shares; what must be the average weekly receipts so as to pay the shareholders 5 per cent., the working expenses being 65% of the gross receipts?

8. A Montreal merchant owes 5,000 francs in Paris. He buys a draft on London when sterling exchange is at a premium of 9; exchange between Paris and London 25.2 francs per £1. What does the draft cost him?

9. A man borrows \$100 from a money-lender and pays it back in 12 monthly instalments of \$10 each. These partial payments are deposited in the Savings Bank at 4% per annum, simple interest. What rate of interest per annum is realized?

10. A person buys 6% Bonds, the interest on which is payable yearly and which are to be paid off at par 3 years after the time of purchase. If he invests his interest when received at 4% compound interest what should he pay for the Bonds to realize 7% compound interest on his money?

11. A farm is mortgaged for \$4,500 bearing 7% interest, payable yearly; the mortgage has 3 years to run. What sum paid down now would be equivalent to reducing the interest on the mortgage to 5%, money being worth 4% per annum, all interest being compound?

C.

12. A certain coin is 1/16 of an inch thick and 3/8 of an inch in diameter; another has to be made of 2 1/2 times the value and twice as thick. What will be its size?

13. It is required to cover a piece of ground 80 feet square by a pyramidal tent 30 feet in perpendicular height; find the cost of the requisite quantity of canvas at 15 cents per square yard.

14. A ball of lead 4 inches in diameter is covered with silver, find the thickness of the silver in order that (a) the volume of silver may be equal to that of the lead, (b) the surface of silver may be twice that of the lead.

15. A mast is 49 inches in diameter at the bottom and 23 inches at the top, and contains 596.75 cubic feet of wood; find its height ($\pi = 2.2$).

16. The sides of a rectangle are 16 and 12; find the distance between the feet of the perpendiculars drawn from opposite vertices to a diagonal.

SOLUTIONS BY W. PRENDERGAST, B.A.

1. (a) A NUMBER is divisible by 5 if its right-hand digit is 0 or 5.

A number is divisible by 9 if the sum of its digits is divisible by 9.

(b) Write down the remainders after dividing the sums of the digits in multiplier and multiplicand by 9; multiply these remainders together and divide by 9; the remainder in this last division should be the same as when the sum of the digits of the product of the given number is divided by 9.

(c)	1st fraction	=	5
	2nd "	= 1/3 of 1st =	.166666
	3rd "	= 1/4 of 2nd =	.041666
	4th "	=	.008333
	5th "	=	.001388
			2.72805 = sum.

2. $277200 = 11 \times 7 \times 5^2 \times 3^2 \times 2^4$
 $1071 = 17 \times 7 \times 3^2$
 $1092 = 13 \times 7 \times 3 \times 2^2$
 $2310 = 11 \times 5 \times 3 \times 2$

G.C.M. = $17 \times 13 \times 11 \times 7 \times 5 \times 3^2 \times 2^2$

3. Manufacturer sells for 3/4 of \$256, etc., etc.
 ∴ agent sells for 1/4 of 3/4 of 1/4 of 256 = \$500.

4. First clock strikes every 3 1/2 sec.
 Second " " " 3 3/4 "
 Diff. = 1/4
 Error of second when first began to strike 12
 = $9 \times \frac{1}{4} = \frac{9}{4}$ sec. too fast.

5. Premium = 1/400 of risk
 3 1/2% of risk = value of property insured
 = 30×160
 risk = $\frac{400 \times 30 \times 160}{393} = \$4,885 \frac{13}{393}$

6. Taxes = 3/4 of 3000 × 1000 = \$37 1/2
 Insurance = 3/8% of 3/8 of 3000 = \$12
 Interest of capital 1/100 of 3000 = 150
 12 | 199 3/4
 \$166 3/4 Ans.

7. Mortgage = \$2,000,000
 Int. on mortgage = \$120,000
 Dividend on shares = \$150,000
 \$270,000 = 3/100 of gross yearly receipts
 Average weekly receipts = $\frac{\$270,000 \times \frac{100}{3} \times \frac{1}{52}}{100} = \$14,835 \frac{15}{52}$

8. $\frac{\$000 \times \frac{10}{100} \times \frac{40}{100} \times \frac{100}{100}}{1} = 961 \frac{11}{100}$

9. The \$100 lent amounts at end of year to
 $\$120 + 10 \times \frac{1}{10} (\frac{1}{2} + \frac{1}{2} + \dots + \frac{1}{2})$
 = $\$120 + \frac{1}{10} (\frac{1}{2}) = 122.20$
 ∴ 22 1/2% = rate.

10. When the bonds mature the investor has the par value of the bonds, the last year's interest, and the amount of \$6 for 2 years at compound interest at 4% and the amount of \$6 for 1 year at the same rate.

Total capital at end of 3 years
 = $100 + 6 + 6(1.04) + 6(1.04)^2$
 = \$118.7296

Cost of bonds = P.W. of 118.7296 at 7% com. int.
 $= \frac{118.7296}{(1.07)^3} = \$96.917.$

11. The problem may be stated as follows:—
 What sum paid now will with \$225 at the end of 1, 2 and 3 years respectively be equivalent to the payment of \$315 at end of 1, 2 and 3 years respectively?

That sum = the difference between the present values of two annuities of \$315 and \$225 respectively, each to run 3 years, money worth 4%

$$= 315 \left(\frac{1}{1.04} + \frac{1}{(1.04)^2} + \frac{1}{(1.04)^3} \right) - 225 \left(\frac{1}{1.04} + \frac{1}{(1.04)^2} + \frac{1}{(1.04)^3} \right)$$

$$= 90 \times \frac{104^2 + 104 + 1}{(1.04)^3} = 90 \times 2.77509 +$$

$$= \$249.75811 +$$

12. $(\frac{1}{16} \times \frac{1}{3} \times \frac{1}{3} \times \frac{1}{7}^2) \times \frac{5}{2} \times \frac{1}{2} \times \frac{7}{2} = r^2$
 $= \frac{5}{36},$ radius of second com. = $\frac{\sqrt{5}}{9}$ in.

13. The perpendiculars from apex of tent on the base and on the side of base, together with line joining the ends of these perpendiculars form a right-angled triangle.

Each side of tent is a Δ with base = 80 ft. and perpendicular = 50 ft.

Cost of canvas = $50 \times 80 \times \frac{1}{2} \times 4 \times \frac{1}{3} = \$133\frac{1}{3}$

14. (a) Let x = thickness of silver

$$\frac{4}{3} \pi (x+2)^3 = 2 \cdot \frac{4}{3} \pi \cdot 2^3$$

$$(x+2)^3 = 2 \times 2^3$$

$$x+2 = 2\sqrt[3]{2}$$

$$x = 2(\sqrt[3]{2} - 1)$$

$$4 \pi (x+2)^2 = 2 \times 4 \pi \times 2^2$$

$$x+2 = 2\sqrt{2}$$

$$x = 2\sqrt{2} - 1$$

15. $BD = 28, NP = 49, AC = y, CQ = x$

$$\pi \frac{4}{3} (x+y)^2 - \pi \frac{4}{3} y^2 = 59\frac{3}{4} \times 1728$$

$$\frac{y}{14} = \frac{x+y}{24\frac{1}{2}}, \therefore y = \frac{4}{3}x$$

$$(2^2 \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3}x) - (\frac{4}{3}^2 \times \frac{4}{3} \times \frac{4}{3} \times x) = 59\frac{3}{4} \times 1728$$

$$\frac{2^2}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3}x - \frac{4^2}{3} \times \frac{4}{3} \times \frac{4}{3} \times \frac{4}{3}x = 59\frac{3}{4} \times 1728$$

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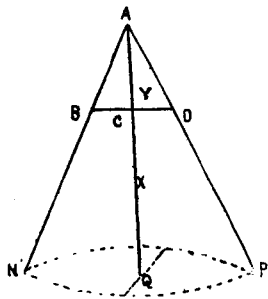
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$$\frac{2^2}{3} \times \frac{4^2}{3} \times \frac{4^2}{3} \times \frac{4^2}{3}x - 4^2 \times \frac{4^2}{3} \times \frac{4^2}{3} \times \frac{4^2}{3}x = 59\frac{3}{4} \times 1728$$

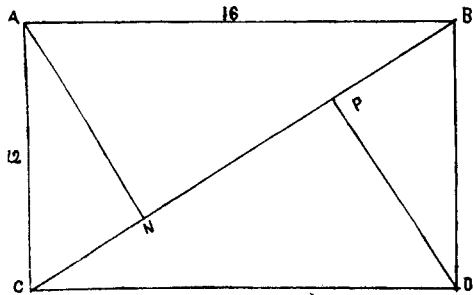
$$\frac{2^2}{3} \times \frac{4^2}{3} \times \frac{4^2}{3} \times \frac{4^2}{3}x - 4^2 \times \frac{4^2}{3} \times \frac{4^2}{3} \times \frac{4^2}{3}x = 59\frac{3}{4} \times 1728$$



16. Diagonal = 20

$16 + 12 =$ twice area $\Delta ACP = AN \times 20$

$$\therefore AN = 9\frac{3}{4}$$



$$CN = \sqrt{12^2 - (9\frac{3}{4})^2} = \frac{16\sqrt{14}}{5}$$

$$NP = 20 - 2CN$$

$$= 20 - \frac{32\sqrt{14}}{5}$$

$$= 3.9466073$$

CORRESPONDENCE, ETC.

THE following solutions of back problems are due to ALEX. H. D. ROSS, M.A., Almonte. For the benefit of new subscribers the problems are repeated.

BETA (July 1890).—In a given time B and C together can do three times as much work as A; A

and C three times as much as B. Show that C alone can complete any given piece of work in a whole number of days, only when all three working together can do it in a number of days that is some multiple of 5.

SOLUTION.—If A takes x days, B takes z days, and C takes w days, respectively, to do the work, then $\frac{3}{x} = \frac{1}{y} + \frac{1}{z}$; $\frac{3}{y} = \frac{1}{z} + \frac{1}{x}$; $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{4}{x} = \frac{4}{y}$.

This shows $x = y$; and $w = \frac{y}{2}$;

and that all three together do the work in $\frac{y}{4}$ days.

Now if $\frac{y}{4} =$ any whole number N , then $x = y = 4N$; $w = 2N$. So that when $w = 1, y = 2, x = 2$. Hence C can do the work in a whole number of days, if all three take any whole number of half days.

[REMARK.—This problem was taken from a Cambridge Honor Paper, but apparently some error has crept into the wording of it. As $2 + 2 + 1 = 5$, it would seem that the words ought to be, "only when the sum of the separate times is some multiple of 5." The error was in the English copy.—ED.]

MU. (July, 1890).—If

$$\frac{1}{x} = \sqrt{b} + \sqrt{c} - \sqrt{a}; \frac{1}{y} = \sqrt{c} + \sqrt{a} - \sqrt{b};$$

$$\frac{1}{z} = \sqrt{a} + \sqrt{b} - \sqrt{c}; \text{ and } \frac{1}{w} = \sqrt{a} + \sqrt{b} + \sqrt{c}$$

Show that

$$\frac{(y+z-x+w)(z+x-y+w)(x+y-z+w)}{(x+y+z-w)^3} = (b+c-a)(c+a-b)(a+b-c) \div 8abc.$$

SOLUTION.— $\frac{1}{z} = \sqrt{a} + \sqrt{c}$ transpose \sqrt{c} , square and equate the rational parts, and the irrational parts.

$$\therefore \frac{1}{z^2} = a + b - c; \text{ and } \sqrt{ab} = \sqrt{c} \div z \therefore \frac{1}{z^2} = \frac{ab}{c}.$$

Substitute these values and $(a+b-c)(b+c-a)(c+a-b) \div 8abc$ becomes $= \frac{1}{z^2}$; and therefore $(a+b-c)(b+c-a)(c+a-b) = abc$, which is true when $a=b=c$. Thus we have $a+b-c = \frac{1}{z^2}$ reduced

to $\frac{1}{z} = \sqrt{a}$; and by symmetry x and y have equal values. Then since

$$\sqrt{a} + \sqrt{b} + \sqrt{c} = \frac{1}{w} \text{ we have } 3\sqrt{a} = \frac{1}{w}. \text{ Now}$$

$$\text{substitute and } \frac{(y+z-x+w)(\dots)(\dots)}{(x+y+z-w)^3} = \frac{1}{z^3} = \frac{1}{8} = A, \text{ as required.}$$

N.B.—The following solution, which starts from the other end of the chain, will be interesting to our readers.

SOLUTION 2.—Take the first factor on the left of required relation and

$$y+z-x+w = y+z-(x-w)$$

$$= yz \left(\frac{1}{z} + \frac{1}{y} \right) - xw \left(\frac{1}{w} - \frac{1}{x} \right)$$

$$= 2\sqrt{a}(yz-xw)$$

$$= 2\sqrt{a} \left(\frac{1}{xw} - \frac{1}{yz} \right) wxyz$$

$$= 2\sqrt{a}(b+c-a)2wxyz; \text{ hence, by}$$

symmetry, second factor

$$= 2\sqrt{b}(a+b-c)2wxyz; \text{ and}$$

the third factor = $2\sqrt{c}(a+b-c)2wxyz$; hence their product

$$= 64\sqrt{abc} \cdot x^3y^3z^3w^3(b+c-a)(c+a-b)(a+b-c). \text{ Similarly in the second stage we have for the denominator}$$

$$(x+y)+(z-w) = xy \left(\frac{1}{y} + \frac{1}{x} \right) + zw \left(\frac{1}{w} - \frac{1}{z} \right)$$

$$= 2\sqrt{c}(xy+zw)$$

$$= 2\sqrt{c} \left(\frac{1}{zw} + \frac{1}{xy} \right) wxyz$$

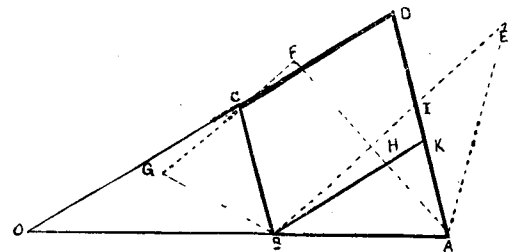
$$= 2\sqrt{c} \cdot 4\sqrt{ab} \cdot wxyz = 8wxyz\sqrt{abc}$$

$\therefore (x+y+z-w)^3 = 64\sqrt{abc} \cdot 8abc \cdot x^3y^3z^3w^3.$
 Thus, on the whole, the fraction on the left
 $= (b+c-a)(c+a-b)(a+b-c) \div 8abc.$

[REMARK.—This example is a good illustration of that "restoration and reduction," which constitutes the science of Algebra.—ED.]

82. The sides of a field measure $21\frac{3}{4}, 16, 23$ and $27\frac{3}{4}$ rods. How can the area be found from these data?

SOLUTION.—The figure is drawn to scale.



$AB = 21\frac{3}{4}, BC = BH = BG = 16; CD = HE = GF = 23; DA = EA = FA = 27\frac{3}{4}.$ \therefore each of the figures ABCD, ABHE, ABGF has its sides of lengths given in problem.

Evidently the areas of the three figures cannot be = unless $AIE = BDC$ and $AHE = FHBG$, which obviously is not the case.

I would suggest three possible solutions:

(a) If BC and AD be // proclude DC to meet

AB in O, and draw BK // OD and $\frac{AO}{AD} = \frac{AB}{AK} = \frac{OD}{BK}$

$$\text{i.e., } \frac{OA}{27\frac{3}{4}} = \frac{21\frac{3}{4}}{11\frac{3}{4}} = \frac{OD}{23} \text{ whence } OA = 51.31 \text{ and } OD =$$

$= 42.57,$ and from this area of ABCD may be found, as we now know, by the three sides of the triangles ODA and OCB.

(b) If two sides be in line like BHE, we get a triangle whose area = $\sqrt{44\frac{1}{4} \cdot 22\frac{1}{2} \cdot 5\frac{1}{2} \cdot 16\frac{1}{2}} = 293.6$, where $\sqrt{s(s-a)(s-b)(s-c)}$ is the area of a Δ whose sides are a, b, c and s the semi-perimeter.

(c) If the vertices of quadrilateral be concyclic we may apply the form $\sqrt{(s-a)(s-b)(s-c)(s-d)}$ where s is the semi-perimeter and a, b, c, d the sides. This gives area = $\sqrt{22\frac{1}{2} \cdot 28\frac{1}{2} \cdot 21\frac{1}{2} \cdot 16\frac{1}{2}} = 251.8.$

85. (April, 1891).—A man embarks his property in four successive ventures. In the first he clears 10% and in each of the others he loses 10%. There remains to him only 23% of his original capital; what was his loss % on the whole in each of the three years?

SOLUTION.—If p represent value of property at first, and x what he lost on 100 invested in each of the last three ventures p

$$\frac{110}{100} \cdot \frac{100-x}{100} \cdot \frac{100-x}{100} \cdot \frac{100-x}{100} = \frac{2.4}{100} \cdot p.$$

$$\therefore 110(100-x)^3 = 2,400,000. \therefore 100-x =$$

$$\sqrt[3]{21818.18} = 27.04 + \text{whence } x = 72.95 + \dots$$

86. (April, 1890).—Equal weights of gold and silver are in value as 20:1; equal volumes as 1284:35. A certain volume is composed of equal weights of gold and silver. How many times more valuable would the same weight of gold be?

SOLUTION.—If 1 vol. gold be worth 1284 and weigh x ; then $1\frac{3}{4}$ " silver is " $640\frac{1}{2}$ " " x ; $\therefore 2\frac{3}{4}$ vols. alloy are worth $1924\frac{1}{2}$, but $2\frac{3}{4}$ vols. gold are worth 3531 $\therefore \frac{3531}{1924\frac{1}{2}} = 1.835 + \text{ans.}$

(See another solution in June number, 1891).

PROBLEM 110. (Eta, July, 1890).—Find the sum of n terms of the series

$$\frac{1}{1.4} + \frac{1}{4.9} + \frac{1}{9.16} + \text{etc.} \dots \frac{1}{n^2(n+1)^2} \text{ and the sum}$$

ad inf.

PROBLEM 111.—A father divides his property among his children as follows: The first gets $\$a$, and $\frac{1}{n}$ of the remainder; the second gets $\$2a$, and $\frac{1}{n}$

of the remainder; the third $\$3a$ and $\frac{1}{n}$ of the remainder, and so on for all. It turns out that all have received equal shares. Find the number of children, the share of each, and the value of the whole property.

Examination Papers.

EDUCATION DEPARTMENT, ONTARIO —
ANNUAL EXAMINATIONS, 1891.

THE HIGH SCHOOL PRIMARY, LEAVING AND
UNIVERSITY MATRICULATION.

PHYSICS.

PRIMARY.

Examiners : { G. CHAMBERS, B.A., M.B.
J. J. MACKENZIE, B.A.
T. H. SMYTH, M.A., B.Sc.

NOTE.—Not more than two of the three subdivisions, (a), (b) and (c) of each question are to be answered.

- (a) Describe a physical method of separating two or more gases.
(b) Describe a physical method of separating a gas dissolved in water.
(c) What conclusions regarding matter may be based upon these conditions and changes?
- Assuming the temperature and pressure to be constant, what would be the effect upon
(a) a loaded spring balance,
(b) a loaded equipoised scale balance,
(c) a vibrating pendulum,
if each instrument were transferred from the equator to the pole?
- Calculate the energy, using any one system of units, of a mass M
(a) at a vertical height of 100 feet,
(b) when set in motion by 10 units of force acting for two seconds,
(c) moving on a horizontal plane at a uniform velocity of 320 ft. per second.
- Describe and explain an experiment to illustrate each of the following :
(a) pitch of sound—using a tuning fork,
(b) reflection of sound,
(c) through what medium sound is propagated.
- Explain the following phenomena :
(a) When a distant gun is discharged the flash is seen before the report is heard ;
(b) Two sounds nearly in unison produce either a throbbing sound or a low musical note ;
(c) In a submerged diving bell a gentle whisper sounds very loud.
- Describe and explain an experiment to illustrate each of the following :
(a) the delusive depth of water,
(b) the compound character of light,
(c) the fact that red paper reflects chiefly red rays.
- (a) Determine experimentally the principal focus of a concave spherical mirror ;
(b) Determine experimentally the minimum deviation of a prism.
(c) A man stands before a vertical mirror three feet long, the bottom of which is three feet from the floor—how tall must the man be to see his full-length image ?
- (a) When a zinc plate and a copper plate are immersed in acidulated water, but not in contact, what happens ?
(b) When they are immersed, and connected outside the cell by means of a copper wire, what happens ?
(c) What unit of electricity has been adopted based upon the decomposition of water ?
- State what occurs when a galvanic current is passed through
(a) a horizontally suspended coil of insulated wire ;
(b) a helix of insulated wire surrounding a soft iron core ;
(c) a vertically suspended elastic brass spiral wire with free end just touching mercury for transmitting the current through the wire.
- In the telephone what functions do the following parts play :
(a) the disk,
(b) the carbon button,
(c) The helix of fine insulated wire ?

PHYSICS.

JUNIOR LEAVING AND PASS MATRICULATION.

Examiners : { G. CHAMBERS, B.A., M.B.
J. J. MACKENZIE, B.A.
T. H. SMYTH, M.A., B.Sc.

NOTE.—Not more than two of the three subdivisions, (a), (b), (c), of each question are to be answered.

- (a) Devise an experiment by which a unit of force may be established.
(b) A spiral spring acts upon different masses ; how can the masses be compared by this means ?
(c) What is the nature of the motion of a body falling from a great distance to the earth under the force of terrestrial gravity only, the body starting from rest ?
- (a) How can the volume (in cubic centimeters) of an irregular-shaped solid and the weight (in grammes) of an equal volume of water be simultaneously determined ?
(b) What precautions must be taken in order to make accurate determinations of these values ?
(c) How many grammes of gold (specific gravity say 20) can be suspended in water by 44 grammes of carbon dioxide gas contained in a weightless bag beneath the surface, assuming that the gas remains at a constant temperature of 0°C , and at normal pressure ?
- (a) What precautions should be taken in the manufacture of the barometer ?
(b) What precautions are necessary in taking reading of the height of the mercurial column of the barometer ?
(c) What properties of fluids are exhibited by the barometer ? Express the normal atmospheric pressure in dynes per square centimetre (density of mercury = 13.6).
- (a) The Eiffel Tower is to be utilized in the liquefaction of gases ? How may this be done ?
(b) Supposing the tower to be 304 metres high, what intensity of pressure could be obtained by means of a liquid of sp. gr. 13.6 ?
(c) Explain briefly some methods of diminishing the pressure of gases.
- (a) Show by reference to experiment upon what property of matter any unit of temperature is based, and also upon what property of matter any unit of heat is based.
(b) Describe an experiment to show that heat is a form of energy.
(c) Why must atmospheric pressure be considered in the determination of the boiling point of a Centigrade thermometer ?
- (a) What happens when heat is applied to the bottom of a tin pail containing water at 0°C ? What happens when ice at 0°C is applied to the bottom of the pail when the water contained in it is at 10°C ?
(b) When floating ice melts in water is the level of the water altered ? Explain.
(c) What takes place when ice at 0°C congealed in a strong vessel is subjected to great pressure ? How may the change be demonstrated ?
- (a) Mention precautions necessary in the determination of the quantity of heat evolved by the condensation of steam.
(b) When ice melts the water formed occupies less space than the ice. How may this change of volume be accurately measured ?
(c) Compare the amount of heat required to convert a given mass of ice at -3°C . into water at 38°C ., with that required to convert the same mass of water at 38°C . into steam at 100°C . [The specific heat of ice is 0.5].
- (a) A single Daniell cell, however large, will not electrolyse acidulated water, but two small Daniell cells can be made to do so. How may the electrolysis be accomplished ? Explain this.
(b) Describe the chemical reactions which take place in a Bunsen and in a Gravity cell respectively.
(c) How would you show which of these cells has the greater electro-motive force ?
- What will be the effect :
(a) When a current is passed through two wires of equal lengths but whose cross sections are as 2 to 1 ?
(b) When a current is passed through a wire in which a current of equal strength is already passing in an opposite direction ?

(c) When a current is passed through a long-coil galvanometer ?

- (a) Explain the object of the iron hammer with its steel spring, employed in the induction coil
(b) How may the electromotive force of a dynamo be increased ?
(c) What constitutes the internal resistance of a dynamo-electric machine ?

CHEMISTRY.

JUNIOR LEAVING AND PASS MATRICULATION.

Examiners : { G. CHAMBERS, B.A., M.B.
J. J. MACKENZIE, B.A.
T. H. SMYTH, M.A., B.Sc.

NOTE.—Candidates may take any six questions.

- (a) Describe experiments to show that one c.c. of hydrogen gas and one c.c. of Chlorine Gas are found in two c.c. of Hydrochloric Acid Gas, and one c.c. of Oxygen Gas and two c.c. of Hydrogen Gas in two c.c. of Water Gas.
(b) Draw the inference from the above experiments that the ratio of the weight of two c.c. of each of these compound gases to the weight of one c.c. of Hydrogen is twice the Specific Gravity of the Compound Gases compared to Hydrogen.
- Discuss the question as to the distinction between a combustible substance and a supporter of combustion. Illustrate by equations the chemical reactions which occur in the combustion of :
(a) Hydrogen in Chlorine.
(b) Oxygen in Marsh Gas.
(c) Carbon Monoxide in Oxygen.
(d) Sodium in Hydrochloric Acid Gas.
(e) Hydrogen Sulphide in Oxygen.
- Explain the meaning assigned by Chemists to the following terms : (a) Oxidizing Agents, (b) Reducing Agents ; write equations showing instances of oxidation, (c) by Oxygen Gas, (d) by Chlorine Water, (e) by Nitric Acid ; of reduction (f) by heat, (g) by Charcoal, (h) by Nascent Hydrogen.
- (a) How would you prepare red Phosphorus from the yellow variety ? Contrast their physical and chemical properties.
(b) How many grams of Phosphorus will be required when completely burnt to take the whole of the Oxygen out of 1,000 grams of air. [$P=31$.]
- Describe the physical changes and illustrate by equations the chemical changes which occur when each of the following substances is heated in a test tube, (a) Ammonium Nitrate, (b) Potassium Nitrate, (c) Lead Nitrate, (d) Calcium Carbonate, (e) Ammonium Chloride.
- Name and give the formulæ of the substances formed by the action of hot Concentrated Sulphuric Acid upon each of the following bodies : (a) Copper, (b) Charcoal, (c) Potassium Chlorate, (d) Potassium Iodide, (e) Ammonium Nitrate, (f) Ammonium Chloride, (g) Calcium Carbonate.
- Explain the chemical and physical reactions which occur in the following experiments—give equations in each case :
(a) A small piece of Sodium is thrown upon Water.
(b) A small piece of Potassium is thrown upon Water.
(c) Chlorine Gas is mixed with Hydrogen Sulphide.
(d) Charcoal is heated with Sulphur Vapor.
(e) Nitrogen Trioxide is mixed with Sulphur Dioxide.
- Describe experiments showing how you would distinguish
(a) Oxygen from Nitrous Oxide.
(b) Nitrous Oxide from Nitric Oxide.
(c) Hydrochloric Acid from Hydrobromic Acid.
(d) Hydrobromic Acid from Hydriodic Acid.
(e) Hydrogen Sulphide from Phosphuretted Hydrogen.

THE spirit of the age is opposed to work. Machinery has made men lazy physically, and our system of education is helping to propagate mental indolence. Move me, sadden me, amuse me, make me weep, make me laugh, make me dream, make me feel, cry the masses of humanity ; but a very few say make me think.—Prof. S. B. Todd, Sterling, Kan.

The Educational Journal.

Published Semi-monthly.

A JOURNAL DEVOTED TO LITERATURE, SCIENCE, ART
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J. E. WELLS, M.A. - - - - - Editor.

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✻ Editorials. ✻

TORONTO, NOVEMBER 2, 1891.

THE SHORTHAND LESSONS.

WE are sorry to be obliged to say that an unexpected obstacle has arisen, the effect of which will be to prevent us from carrying out the arrangement proposed in regard to the promised lessons in shorthand. The simple fact is that the Pitman system, which Mr. Moran uses, is copyrighted in England, and so of course in Canada, and that we have been notified by the Canadian agents of the Pitmans that our publication of the lessons would subject us to an action for infringement of copyright. The EDUCATIONAL JOURNAL has no intention or disposition to infringe upon the rights of anybody. It had never occurred to us that the Pitman system, which has been so long in general use, was not now public property. Under the circumstances, we have no alternative but to withdraw our offer and express our regret to all who have been in any way inconvenienced. To those who have sent us the fee in advance, it will be, of course, promptly refunded. All others interested will please accept this explanation.

METHODS AND METHODS.

“EXALTATION of Method,” is one of the sub-headings in Dr. McLellan’s Special Report on Normal Schools. “There is at present,” he thinks, “a strong and general tendency to depend too much on methods as methods. Amid interminable discussions on methods there is danger of forgetting the essentials of the true teacher—learning, culture, sympathy, enthusiasm, character—in short *personality*. Behind the method there must be the man.” This truth cannot be too strongly emphasized. We are glad to believe that a healthy reaction is already setting in against the tendency, and that there is at present less danger of reliance upon mere methods being carried to a mischievous extreme than there was a little while ago. This is at least the impression we receive from the general tone of our educational exchanges.

But given the man or the woman, with the indispensable qualities above enumerated, it cannot be denied that success still depends very largely upon good methods. We think we have known teachers who possessed these qualities in a very good degree, who yet have seriously failed for want of knowledge of the best methods. To the best teachers of a quarter of a century ago, a hint of some of the methods of teaching which are in common use to-day would have come as a revelation and an inspiration. Had some one but suggested to them that it might be well to substitute inductive reasoning for dogmatic teaching, thought-work for rote-work, the process of discovery for that of memorizing, both their usefulness and their delight in the work would have been vastly increased, and they would have been able to arouse an enthusiasm in their pupils which it was simply impossible to produce while confining them to the old paths marked out by the educational orthodoxy of the day. It would, of course, be extravagant and absurd to suppose that there was not much of genuine educational work and intellectual development under the old systems. The mind is happily so constituted that activity of any kind strengthens its powers. Moreover a certain amount of independent use of those powers, proportioned to the originality and force of the individual mind, is sure to accompany and follow every new fact reached, by whatever process it may be gained. Still the loss of power was unquestionably great, and the loss of the enjoyment and delight in this use of the intellectual faculties which furnish nature’s impulse and reward for perpetual student-ship was still greater and more regrettable.

But what we wish especially to point out, just now, is the need of care in the choice

and use of methods. There are methods and methods; methods good, bad and indifferent. It is of course impossible to frame a full descriptive catalogue of methods in this, that and the other subject, and say this is good, that is bad, the other is indifferent. What we may attempt is to lay down one or two general principles which each teacher may apply as tests as occasion requires. We should be disposed to suggest as one of the first and most important rules: *Reject the method which simplifies too much.* The “too much” must of course be determined by the capacity of the pupil. We have, in a previous article, intimated our doubt whether this is not a great danger in the Kindergarten, unless in the hands of the very best teachers. We feel very sure that it is a serious evil and danger in the primary, and perhaps in the first and second classes, in the public schools. In such simple processes as numeration and notation, addition and subtraction, the little ones are sometimes led on by such roundabout, useless and tedious processes that they must be wearied and disgusted with the monotony of the thing, long before the end is reached. “Teaching children to understand the powers of numbers,” etc. such work is often called, just as if the ordinary child did not have the elementary conception of numbers long before he enters the school-room. Give even the six-year old credit for having some brains, and some power even of abstraction and generalization, and find out what he really knows and is capable of doing, before commencing your tedious variations and repetitions of the simplest processes, and you will often be astonished at the results. The decimal method of notation is, of course, purely artificial, and will need to be carefully explained, in connection with the various operations with figures, but it is sometimes astonishing to find how quickly the child will grasp the principle of the decimal notation. See that he understands not simply the process of “borrowing” and “carrying”—we do not think he should be taught either the words or the process they denote, until he has been led to understand the principle—but has an insight into the principle of the decimal notation, such as will enable him to understand the “reason” for the borrowing and the carrying. Then again while the child’s first step in arithmetic should be aided by the use of objects, such as the fingers or blocks, let these helps be discarded just as soon as he shows the capacity for forming and dealing with the ideas of number they represent, without the aid of objects.

But our article is long enough. We may continue the subject in another number.

UNIVERSITY EXTENSION.

A CIRCULAR from the Minister of Education announces that a meeting to consider the propriety of organizing a Provincial scheme of University Extension will be held in the Public Hall of the Education Department, on Thursday, Nov. 5th, when addresses will be delivered by Professor J. E. James, President of the University of Pennsylvania, and leading Canadian educators. This is a movement of great importance. We hope that the meeting will be largely attended by the friends of education, and that it may result in the formation of an independent and fully representative Society for carrying on University Extension work in the Province.

* Editorial Notes. *

WE recommend to every teacher, and especially to every rural teacher, Mr. Fred. Brownscombe's admirable paper in this number. It is lengthy, but will not be found tedious, and it is brimming with excellent suggestions of a thoroughly practical kind.

It will be a matter of interest and pleasure to many of the teaching profession to learn that the hours of lecture for the first year in the Women's Medical College of Toronto, have been so arranged that they in no wise interfere with the regular working hours of those ladies otherwise employed."

As the result of an exciting contest in the Toronto Public School Board, Mr. Chapman was appointed to the new Inspectorate by a majority of 14 to 12, as against Mr. Colles, School Inspector of Kent Co., who was the nominee of the School Management Committee. Among other candidates who ranked high in the favor of the Board were Mr. McMillan, who was defeated on a tie vote, Mr. McAllister, Mr. S. B. Sinclair, Mr. Bruce and others. The new Inspector is Principal of Niagara Street School, has been in the service of the Board for six years, and has a good record as teacher in Waterloo and Berlin.

"To make this paper really valuable it must be intensely practical. It must come down to the real needs of the workers in the school-room. In that school-room there are serious difficulties. Some of these are the sauciness, the answering back, the defiant look, the scowling face, the slamming down of slates when offended, etc. How do you meet these troubles? Let us have the methods you have absolutely found successful, not what you think would be successful.

Write them out and send them to us. Your name will not be published unless you wish." We adopt the above from the columns of a contemporary. It expresses just what we ourselves desire of our patrons. Let us have your views and methods on all manner of practical work in the school-room. It will do you good to put them on record, and your experience may prove helpful to many.

THE lady who was heard, it does not matter when or where, sharply condemning the High Schools because they educate the children of laboring people "out of their sphere," making them "unfit to be servants," etc., is, we fear, by no means a rare specimen of a genus that ought to have been long since extinct. The incident, however, contains a hint for the teacher. The idea that all manual labor is essentially degrading, or that some kinds of labor are in themselves less honorable than others, is a prejudice that dies hard. The true teacher will lose no opportunity to help kill it. The sooner the young of our country can be trained up to a practical belief that there is dignity in all useful labor, and that the only difference a good education should make is to enable its possessor to do the thing that lies next him as a duty better than the uneducated can do it, the sooner shall we be prepared for the blessings of universal education in the good time coming.

Book Notices, etc.

Plane Trigonometry. By I. J. Birchard, M.A. William Briggs, Toronto. pp. 250.

This is a book very much of the same style as the High School Algebra. The work is pretty well arranged for teaching purposes; but it contains a considerable amount of matter that might have been omitted as irrelevant to the course required by our Canadian colleges. The theory is stated elaborately and carefully, but the amount of practical examples for solution is limited to twenty-nine short exercises and a dozen examination papers. The style of the explanations is well suited to the student who has little oral teaching, but this means that there is little space left for the copious graded examples which teach the subject most impressively as well as most rapidly. The student who masters this book will know the subject well, but in the present crowded state of the High School programme, we fear that few students will give the time required for so large a book.

The Solution of Difficulties in Arithmetic, contains over 350 problems solved out, followed by a careful selection of examples. Pp. 325. 4/6. Moffatt & Page, London.

This is one of the few good books of the kind. It is a treatise on Arithmetic in which all the work is practically set out by examples with short explanations. To Canadian teachers it will prove far more useful for III. Class and II. Class work than the lately incubated "High School Arithmetic." It covers more ground, and in a better manner. The Civil Service papers in Higher Arithmetic are very good.

Plane and Solid Geometry. By Seth T. Stewart. American Book Company, New York. Pp. 400 \$1.12.

Each of the ten sections treats of one subject only, thus:—Chap. I., Straight Lines and Angles; Chap. II., Triangles; Chap. III., Quadrilaterals; Chap. IV., Circles, etc. The principle of association and the principle of grading are closely followed. The volume is an eloquent protest against the Euclidean system; the elegant style of printing and binding and the reasonable price show how much advantage would accrue to us in Ontario by free trade and free competition in text-books. The book is of no special value to Canadian schools.

Question Drawer.

(Continued from 536.)

SUBSCRIBER.—We regard the sentences forwarded as follows: (a) "The house as well as its inmates was destroyed by fire" is quite permissible. Our language does not treat "as well as" always as equivalent to "and." If we lay stress on "house" the verb must be singular; if we wish to state the fact of house and inmates being burnt, the plural verb is perhaps preferable. (b) "Agreeable to his promise he came this p. m." is both wrong and vulgar. He came agreeably to (in agreement with) his promise. The adverbial form is plainly required, as the word has adverbial force. Then "p. m." is not used by correct speakers for the English word afternoon, unless they wish formally to describe the hour of the afternoon, e.g. at four p. m. (c) "Hoping to hear from you, believe me truly yours," is faulty in construction. "Hoping" describes a person who is represented grammatically by the understood subject of the verb "believe"—"you hoping . . . believe." This is not the sense; therefore to speak sensibly we say "Hoping to hear from you, I remain, truly yours," or "I hope to hear from you soon. Believe me, etc." (d) "I shall have great pleasure in accepting your invitation" is quite right, if your acceptance is to take place at some future time. If it is taking place at the time of speaking you should say "I have great pleasure, etc." (e) "This paper has the largest circulation of any paper in the city" is a faulty confusion of two constructions, (i) This paper has a larger circulation than any other in the city; (ii) This paper has the largest circulation of all papers in the city. England has practically free trade.

CONSTANT READER.—Following are the names and departments of the members of the Ontario Cabinet, as at present constituted. Premier and Attorney-General, Hon. Oliver Mowat; Commissioner of Crown Lands, Hon. A. S. Hardy; Commissioner of Public Works, Hon. C. F. Fraser; Provincial Secretary, Hon. J. M. Gibson; Provincial Treasurer, Hon. Richard Harcourt; Minister of Education, Hon. G. W. Ross; Minister of Agriculture and Registrar, Hon. John Dryden; Without Portfolio, Hon. E. H. Bronson.

A SUBSCRIBER.—Population of cities of Canada: Halifax, N.S., 42,000; St. John, N.B., 43,300; Fredericton, N.B., 6,000; Charlottetown, P.E.I., 13,600; Montreal, Que., 250,000; Quebec, 75,000; Three Rivers, Que., 9,500; Sherbrooke, Que., 9,000; Ottawa, Ont., 44,000; Kingston, Ont., 20,000; Belleville, Ont., 11,500; Toronto, Ont., 200,000; Hamilton, Ont., 45,000; St. Catharines, Ont., 10,500; Brantford, Ont., 13,000; Guelph, Ont., 11,000; Stratford, Ont., 10,000; St. Thomas, Ont., 10,000; London, Ont., 32,000; Winnipeg, Man., 28,000; Brandon, Man., 4,000; Victoria, B.C., 18,500; Vancouver, B.C., 15,000; New Westminster, B.C., 8,000. The above are not the exact figures according to census of 1881, but the approximate present populations as given in the *Canadian Almanac* for 1891. Some of the cities have grown so much within the last ten years that the figures of the census of 1881 would convey a very erroneous impression. Hence we assume that the above will better serve your purpose. The list does not include every place which ranks as a city, nor, on the other hand, large towns such as Chatham, Woodstock, etc., which have larger populations than some of the cities. Population of the Provinces, etc. in 1881: Ontario, 1,923,288; Quebec, 1,359,027; New Brunswick, 321,233; Nova Scotia, 440,572; Prince Edward Island, 108,891; Manitoba, 65,954; North-West Territories, 56,446; British Columbia, 49,459. Of course there has been considerable increase in Manitoba and the Territories within the ten years.

Primary Department.

HABITS.

RHODA LEE.

THE value and power of correct habits, physical, intellectual and moral, cannot well be over-estimated. It is the training in the formation of good habits that fits the child for that complete living which is the end and aim of true education. We look to the home for much of this training but how frequently do we look in vain. In the rush and hurry of living, in making provision for the temporal needs and comforts, how little attention is paid to the *real* wants of the child, how little time given to the smoothing of the road and the strengthening of the feet "that such long years must wander on through hopes and fears."

A habit is one of the few things much more easily made than unmade. Repeated action makes a habit. Habits form character. Consider the number of times in one day that a child acts or speaks in response to your commands, and realize your influence, fellow teachers. The burden falls heavily upon all, but perhaps we primary teachers should feel the greatest weight. With us school action begins, and it is at the commencement of this new epoch of the child's life that he has most need of our careful guiding and guarding. The force of a habit formed during the first year at school will be felt throughout the whole school life and will leave its ineffaceable mark somewhere.

When we raise our eyes to the ideal before us, how numerous are the habits we would cultivate. Obedience, honesty, truthfulness, promptness, attention, application, observation, thoughtfulness and sympathy, politeness and a score of others. The earnest teacher will find and make opportunity for the cultivation of these and many more habits one might name.

There is one habit which, though admitted by all to exert an unbounded influence upon the character of a girl or boy, does not receive due attention in lower classes. For want of a better name I must call it *neatness*. While I would wish this to include carefulness in personal appearance, school apparatus, books, desks, cloak-rooms, etc., I refer particularly to book and slate work, the latter being the foundation for all. A chaotic, undisciplined mind will always accompany and result from careless work, while habits of carefulness and neatness will assuredly bring precision of character, with clearness and definiteness of thought.

In classes where writing and exercise books first come into use, the children, if directed and inspired aright, will take an immense amount of pride in them. Such books are a joy to behold!

On no account should careless work be tolerated for a day. It may be neat, though far from perfect. Even when the children know the powers of only two or three letters, they can make their slates present a neat appearance. Every letter immediately below the one above, with uniform distances between. Of course, I am presuming that every primary teacher

scratches her slates for writing and drawing. Having tried many plans advocated, I have decided upon the plain ruling of lines, at equal distances, the entire length of the slate. Quarter-inch blocks for drawing cover one half of the other side, leaving a part of the slate blank for miscellaneous work. Watchfulness must be your motto if you would cultivate the habit of neatness. *Examine* the work. Make time, take time, to mark and correct the slates, giving encouragement and suggestions for improvement in the busy work. This does not mean anything or everything that fills up the time and keeps otherwise idle hands busy. No, it means intelligent, developing work that will give increase of power and promote habits of industry and carefulness.

Use a special mark and keep some one of your brightest crayons to give as a reward to your most painstaking scholars. After the children understand thoroughly the meaning of neatness, allow one or two to choose the best slates. My little folks are particularly delighted if I allow the owners of these good slates to carry them into the Principal's room for his inspection. Of course, in time, these little bits of emulation will become unnecessary as all will be "best."

An honor roll for neatness is a great incentive to good work, and the children will put heart and soul into their efforts to be classed in this list. Consider this a great honor and one very much to be desired.

I must add in closing that I am a true advocate and lover of individuality, and hope never to say anything in these columns to discourage it, yet I cannot think that this plea for uniformity, neatness and definiteness interferes in any way with the development of freedom and personality.

Early habits are undoubtedly the most easily formed and preserved. Habits that we find necessary in the after years to form often cause us much self-denial and suffering and never then have the same strength or stability.

CUT-UP STORIES.

BY ANNIE EVANS, LONDON.

(Continued with words found up to Lesson XXI.)

No. 1. I have told you of May and her pets, so now will try to tell you of some girls and boys who went to fish.

No. 2. We have here Ann, May, Mab and Fan; Sam, Ben, Tom, Dan, Rob and Tim.

No. 3. They all got up with the sun and did some jobs they had to do. Rob had to rub the mud off the cart with a wet rag.

No. 4. Ben saw that the kid was fed; Dan had to see that the dogs were fed.

No. 5. Sam was a bad boy and had to do some hard sums, and Tim had to cut some logs.

No. 6. Tom got the rods and the girls cut the ham and put it with some buns and jam in a tin box.

No. 7. Papa went with them and had his gun to get a shot at the red fox in the fen.

No. 8. The man put the nag to the cart and they got in and are off to have a gay day.

No. 9. They got some fish and had lots

of fun. They saw a cub in a lot and went to see it.

No. 10. They got some nuts and saw a man tap the trees for sap. The girls let some sap run into a tin cup and had a sip of it.

No. 11. The boys hid from the girls in a barn, but when the girls went to get some eggs they saw them.

No. 12. Papa shot the fox and the girls got the skin as the boys had got some oil from the fish.

No. 13. As the day goes on Papa says to get into the cart to go home. They are soon off to bed, and forget in rest the gay day they have had.

HOW TO INDIVIDUALIZE.

ARNOLD ALCOTT.

"You seem to have taken quite a fancy for the *how's* in your titles for the articles of this session's work in THE JOURNAL."

"Yes, I have thought that perhaps a devotion of some numbers of this department to methods of doing this, and of teaching that might be just the sort of help which is most needed."

Notes from subscribers to our JOURNAL, who are especially interested in the Primary Department, telling just what sort of aid they would like the Editors to give them would be cheerfully received and duly acknowledged by us. And we would endeavor in every possible way to comply with their requests for papers on this or that part of the work. We try to be general, to meet the needs of all, and yet perhaps; what we think necessary may not include some particular case. Let us once again give our readers a hearty invitation to write us whenever they would like assistance or suggestions along a particular line of the work.

My heading is, How to Individualize:—class teaching *versus* individual teaching.

It is impossible to make the former as perfect as the latter. We know that with a private tutor a student misses what is called the "sympathy of numbers," and loses the inspiration and fellowship of other minds which give stimulus and elevation to his own. Nevertheless he himself is better known and studied by the teacher, and all the teaching is adapted to his peculiar character and needs. Now, in large classes such as my readers have, individual teaching can be carried only to a very small extent; and although the earnest teacher is always endeavoring to pay special attention to each particular pupil, yet she must necessarily aim to make every pupil receive a sturdiness of character which will enable him to take care of himself. This self-care is what the class teacher should inculcate.

Just here it seems to me that a caution is necessary. It is this. Do not allow the dullness, the intellectual and moral vacuity of any of your scholars, to occupy too much of your time. Do not worry about the backwardness of the ill-favored. That is, do not be extreme in your individualizing. The elevation of the mass is the first consideration, and nothing should give it a second place.

Let me give a series of questions which are plain, practical and calculated to develop the minds of the pupils in Arithmetic.

These questions are for ordinary primary classes and ordinary pupils. With Senior First, Junior Second, Senior Second, the higher primary classes, they may be used as Mental Arithmetic.

1. How many two-cent stamps can be bought for a ten-cent piece?
2. How much must we add to $\frac{1}{4}$ of an apple to make two apples?
3. How many pints in a quart and a pint?
4. What two pieces of money equal seven cents?
5. Willie is nine years old; how much longer must he live before he is sixteen?
6. Name a word that has more letters in it than horse.
7. How many more letters in the word exhibition than in the word holiday?
8. Name five things you can buy for ten cents and tell what each costs.
9. One cat caught as many mice as she had feet; another cat caught as many mice as she had ears; another as many as she had tails. How many mice were caught altogether?
10. How many five cent pieces equal twenty cents.
11. A lady had three quarts of vinegar for pickling. She put it into bottles each holding two pints; how many bottles did she fill?

We may give more sample questions in a later number. One word more. Try an arithmetic match, to arouse intense interest and life. Success is sure.

* Hints and Helps. *

OUTDOOR SUPERVISION.

REBE.

At what time in the morning do your pupils leave home for school?

Do they loiter on the way; if so what are they doing?

Are they in the habit of dropping into neighbor's houses or orchards?

Are they always polite to people whom they meet?

How are their noons and recesses spent?

When you go home for your dinner what are your pupils doing? In our schools forty out of fifty pupils bring their luncheon.

Do your pupils ever play on the roads, or wander off to the fields where Bill Thomson is ploughing, or ride on passing vehicles?

Is tobacco used among your boys?

Are your pupils quiet and orderly in going home from school, and do they go home directly?

In short, do your girls promise to become womanly women, and your boys to become manly men? Are you ever watchful lest they enter into temptation?

I have a fear, a painful fear, that we as teachers are not doing all our duty. This moral supervision of our children is by far our most responsible obligation. Such opportunities as we country teachers have to mould character. The little ones are with us till they are little ones no longer, and the rural teacher is so important a personage that his words and actions have very great weight. Indeed in the latter fact there is a danger for the teacher, though I think it is just possible that his numerous failures may suffice to teach him humility.

How then may the teacher exercise this moral supervision? He cannot be with his pupils always.

First, he should be a careful student of his pupils; he must learn to read much from little, to understand signs rather than words. Sources of indoor difficulties may be suspected to have their existence outside.

The teacher must visit the homes. This will be an excuse for going from school with the children

quite frequently. The children should not be permitted to visit on their way home unless for some good reason.

The pupils can be taught to be careful of the reputation of their school. Nothing so sullies its honor as impertinence. The teacher wants to have one of the best schools in the township. So do the pupils.

"The recess and noon are periods when watchful care should be strengthened, not relaxed," is a sentence full of meaning. The children should not be allowed to leave the yard without permission, and that should rarely be granted. Never under any circumstances should the pupils play on the road or hang on passing waggons or sleighs. The boys should be assigned one-half the playground, the girls the other, and the games may be only played together when the teacher requests it and assists, or remains near. The children must not be allowed to feel that they are watched, else the teacher misses his aim. If the children are busily employed in play during the whole time for recreation they will be tolerably safe.

The teacher's own senses of seeing and smelling must enable him to detect the presence or the use of tobacco. Then he must drive the pernicious habit out by example and by teaching.

The boys and girls must be enlisted on the side of right, for in them lies a mighty power. "You send your boy to the school-master but 'tis the schoolboys who educate him," wrote Emerson. Truly these school-boys are potent teachers! Only watch one of these teachers handle his class, and you have the secret. The sparkling energy, apt illustrations, confident bearing and decided statements of the teacher and the rapt attention of his pupils show that his subject is not only interesting but that the teacher is master of it, managing it well and throwing his very self into it.

The indoor teaching must bear strongly on the outdoor living. There is a beautiful model for us in our teaching given by Paul. "Finally, brethren, whatsoever things are true, whatsoever things are honest, whatsoever things are just, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report; if there be any virtue and if there be any praise, think on these things."

"Think truly, and each word of thine
Shall the world's famine feed;
Speak truly, and each word of thine
Shall be a truthful seed;
Live truly, and thy life shall be
A great and noble creed."

OUR SCRIBBLING BOOKS.

REBE.

ALL the classes from the Part II. upward use them. Oh, no, we haven't discarded slates, the books are only supplementary. I "canna thole" the coverless bundle of grease-spotted, ink-stained, dog-eared leaves, in which may be found a page of arithmetic, a page of written spelling, a page of geograghy, all being interspersed with crooked lines. And more than that, I want my pupils to have the same feeling. So I have found it necessary to teach my children how to keep their books in order.

PART II.

Soon after promotion, the little folks bring their lead-pencils and new scribblers, with proud pleasure showing in their eyes; and after the books have been exhibited to an admiring throng, I take possession of them for a little time. The fourth class assist in preparing the books for use for Monday. We like to enter upon new projects on Monday. A vertical line is drawn, leaving a margin of three-quarters of an inch, and the page is filled with horizontal lines similar to those on ruled foolscap. It is necessary that the ruling be straight and the lines distinct, but not heavy; half a dozen leaves may be treated in this way. On three days in the week the little folks transfer the words, phrases, or short sentences that may have been written on their slates, in the class, as an exercise in spelling, to these ruled pages.

The second quarter of the book we use for arithmetic, some pages blank, some ruled. The little folks do one exercise at a time like the following:—Write the numbers up to one hundred, by twos, or by threes, or by fours, etc. Write all the Roman numbers from ten to forty. Write Roman numbers for 5, 8, 9, 20, 21, etc. Columns of figures may be given to be added; there is no dearth of work.

In the third quarter there is more ruling, but the lines go in pairs, their distance apart being determined by the height of the little ones' writing. On the days in which they do not write spelling in the books, they write a "copy" which has been placed on the blackboard—small letters, capitals, words or sentences, furnish room for variation. Soon they may write portions of their reading lessons.

Language finds a place in the fourth quarter. The little folks can make sentences about a pond, a boy, an old tree, and may be taught to use the capital to begin, and a period to end a statement. They enjoy very much filling blanks, *e. g.*, I saw a big ——. Tom found a — in the old —.

Some of the most orderly pupils, may, after considerable slate practice, do their own ruling, but it seems to be too much to expect of the majority. After the pupils reach the second class, aid should gradually be withdrawn.

SECOND CLASS.

The scribblers are filled in much the same way, save that the work is more advanced and may be given in increased quantities. A whole paper in arithmetic or literature may be set, maps of the school-house, spheres, showing axis, equator, and zones, may be drawn, letters or stories, after being first written on slates, may be copied. In fact there is no end to what a second class may do, but we must remember not *how much* but *how well*!

Upon the completion of a given exercise, the books are handed in, and each one is examined, and mistakes noted. Much of this work must necessarily be done after four, but the errors may be pointed out to the class by using examples on the blackboard, and pupils may be required to re-write their work.

The scribblers are never taken home by the children, unless to show father or mother how well they are doing. Thus accidents are avoided, and the books present a tidy appearance.

THIRD CLASS.

The pupils have one for home-work, and one for school exercises while they may have other books in which work is to be done with pen and ink.

In teaching it is well to keep in the mind's eye the object or objects at which one is aiming.

OBJECTS.

Cultivation of order. We learn to be orderly by being orderly. By degrees the child will recognize advantages arising from an orderly arrangement of his work and effects.

Habits of industry. The child who has nothing to do soon becomes lazy and troublesome. There is enjoyment in work, and the child can find it if the work is of the right kind. If he finds pleasure in it, it follows that he will be willing to do more.

Testing the pupil's knowledge. The weak places in the child's knowledge may be found and strengthened. He cannot be successful in his written work if he does not understand it.

Employment as a help to discipline. This of course should be a minor object, but we find that when our school are employed, Mischievous is looking for a job.

Improvement. Advancement is expected in each subject and the hand, mind, and eye are being trained.

Keeping up interest. The varying styles of the scribblers, the variety of exercises, the change from slates and pencils to paper and lead pencils, the comparison of new work with the old, or of one pupils' work with that of another, and the teacher's commendation—all cheer and encourage the active little students.

As a general thing we are too chary in praising and encouraging the efforts of the young—too free in criticising and depreciating them. Many a child's powers in various directions are thrust back into inactivity by the cold, unappreciative reception they meet with. Children quickly adopt the sentiments of their elders, and soon learn to put the same value on their own powers that others do. The parent, the teacher, and the employer can easily teach lessons of self-depreciation which may cling through life, and forever prevent the development of powers that under more favourable auspices might have proved a blessing to the community; or, on the other hand, by cheerful encouragement and wholesome commendation, they may nourish many a tiny germ of ability and talent that may one day come to be a mighty influence, a perceptible power, in the world.—*Anon.*

RYLEY—"Why is that flannel suit you have on like most of the members of the New Rochelle Yacht Club?"

WILSON—"I'm a 'jay' for the summer, so I'll give it up."

RYLEY—"Because it shrinks from water and—at this point the boom interfered and the rest of the answer was lost."

SHE'S been yachting all this summer,
And she's got a yachting way
And a set of sailor speeches
When she's anything to say;
When I told her that I loved her
I was rather taken back,
For she smiled and said, "Now chappie,
You had better take a tack!"

THE attention of our readers is directed to the advertisement of the Ontario Business College, Belleville, Ont., now in its twenty-third year. The teachers who have graduated from this famous institution have achieved great success. Its students are drawn from all sections of this continent, and from the West Indies. One of its principals, Mr. J. W. Johnson, F.C.A., is this year first Vice-president of the Institute of Chartered Accountants of Ontario.

WOOL—"I suppose it is allowable for a cat to look at a king."

VAN PELT—"But why should a cat want to?"

WOOL—"In the case of Emperor William he might want to compare whiskers."

THE shoemaker sharpened his knife,
For he and his wife were at kstrife,
And he said, "Now at klast
All bounds you have kpassed!
Say your prayers and bid farewell to klife!"

GIRLS who have the reputation of being "afraid of their shadow" show great courage in the presence of a looking glass.

DR. T. A. SLOCUM'S

OXYGENIZED EMULSION OF PURE COD LIVER OIL. If you have Tightness of the Chest—Use it. For sale by all druggists. 35 cents per bottle.

PENELOPE—"I see we have a new guest at the hotel."

PERDITA—"I wonder why they call a boarder a guest?"

PENELOPE—"Because one is guessed about so much, I suppose, by the other people."

THE wedding was over, the vows were said,
The couple were filled with bliss,
When the minister shook the hand of the bride
And gave her a smacking kiss.
The groom didn't like it, and said right away—
"Her kisses are not cheap, see?
And the one you've taken will do you as well
As a ten dollar wedding fee."

I met her first in the leafy June
Down by the azure sea,
A perfect gypsy there she seemed,
Her ways were gay and free.
I see her now upon the street,
So haughty, cold and staid;
Alas! the autumn ripens e'en
The witching summer maid.

THE Acme Washer and Bleacher advertised in our columns this issue is all that is claimed for it, and from a personal knowledge of its merits we can cordially recommend it, and can without any hesitation say that any orders received will be promptly and satisfactorily filled.

THOUGH winter still is distant
An instinct shrewd obeying
The girls are all preparing
Already for the slaying.

JONES—"Did you have a good day's sport?"

BROWN—"Splendid."

JONES—"How did my dog work for you?"

BROWN—"Wonderfully. He led me directly to the game market."

ENPEC—"The Doctor says it wouldn't take but a breath to carry me off."

MRS. ENPEC—"The breath you brought home last night was strong enough."

BIGGSY—"I see that Queen Victoria has taken to smoking."

WIGGSY—"Impossible!"

BIGGSY—"It's true; the *Herald's* cabled account of the garden party at Marlborough House says, 'When the Queen arrived the Prince of Wales helped her to alight.'"

NEWSBOY—"Paper, sir?"

WELL DRESSED MAN—"No; I can't read."

NEWSBOY—"Look at the pictures, then."

Now doth the curtain rise throughout the land
And Thespians roar in mimic joy and rage,
Far as the broad Pacific's placid strand
Rant, kick and strut the legions of the stage;
Chicago sees the white tiled minstrel band
And weeps o'er Uncle Tom, e'en in his hoary age.

"I DEMAND toll," he said, stopping her before the gate.

"It's too suggestive of a funeral," she answered, "to toll the bells."

HE—"Here is a poet who has written some verses entitled 'By the Sea.'"

SHE—"Well, I suppose a poet could buy the sea as easily as he could buy anything else."

SHE was a dainty autumn girl,
Her eyes were soft and sweet,
But, woe is me! the hair she wore
Looked like a sheaf of wheat.

JUST now the freshman fresh infests
The college halls elate,
He'll fresh and fresh and fresher grow
Till he's a graduate.

VAN RENTSY—"Would a proposal be inopportune this evening Miss Peachblow?"

PENELOPE (*blushingly*)—"N-no."


VAN RENTSY—"Well, I-I-I'll go and tell the boys."

THAT "all the world's a stage" I think
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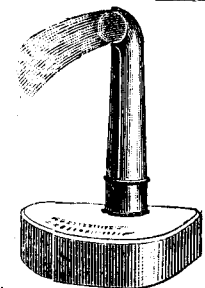
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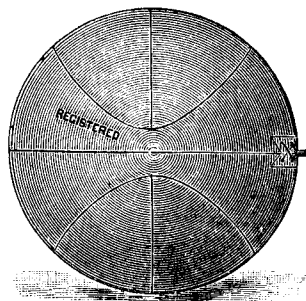
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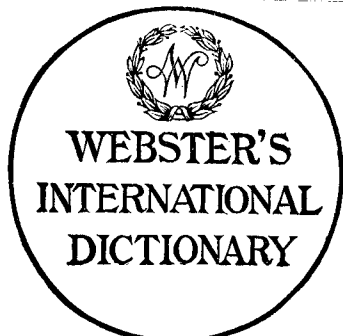
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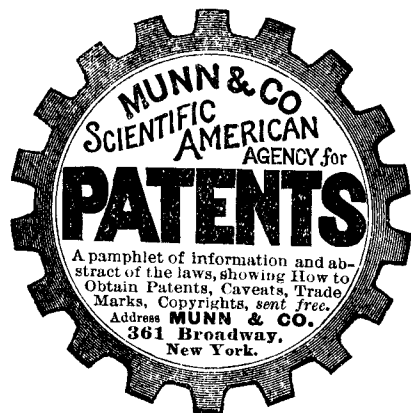
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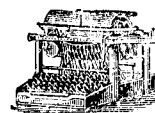
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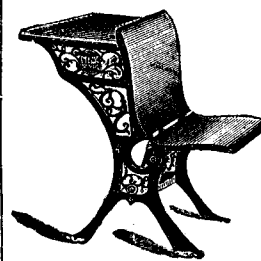
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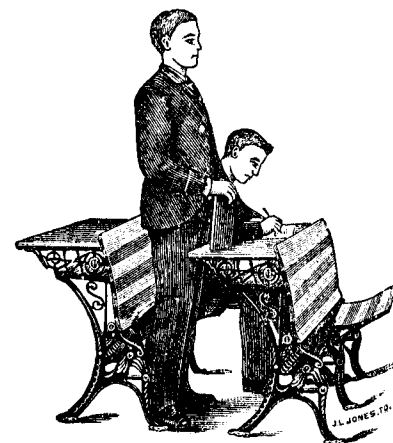
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Re Policy 5005.

MY DEAR SIR,—I beg to acknowledge receipt of your favour of the 6th inst., enclosing cheque in favour of Mrs. Cummings and myself for \$2,000, being the full amount of the claim under above policy on the life of my brother, the late Oliver C. Cummings. You will kindly accept the thanks of Mrs. Cummings and myself for the promptness in which you have attended to this matter and paid the claim. I communicated the contents of your letter to Mrs. Cummings, and she wished me to express to you her appreciation of your words of sympathy.

Regarding the promptness with which you have attended to this claim, I may say that proofs of death were delivered to your Company, the Confederation, and the Canada Life the same date, but your Company is ahead of all others in time of payment.

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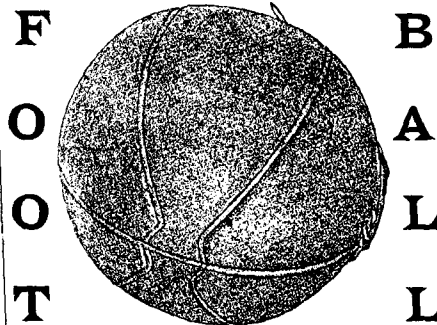
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