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The Canada School Journal.

Vol. III.

TORONTO, OCTOBER, 1878.

No. 17.

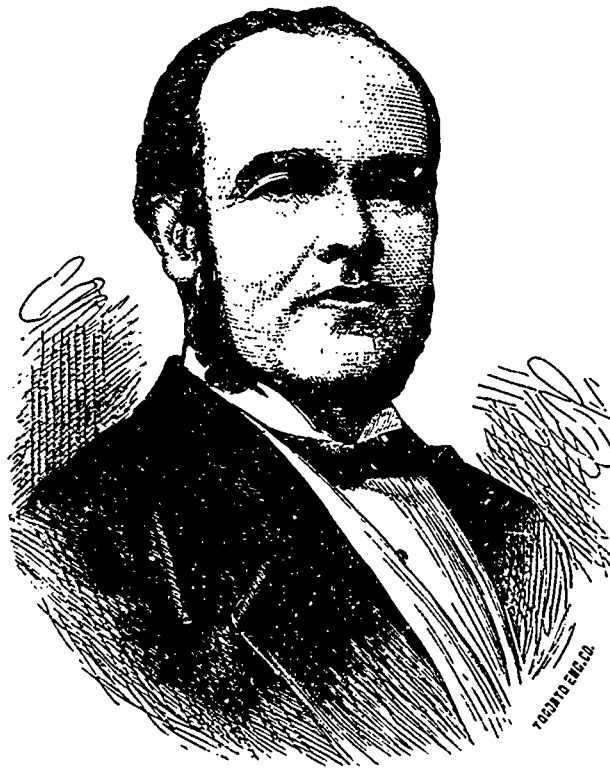
J. A. MACCABE, ESQ., M.A.,
PRINCIPAL OTTAWA NORMAL SCHOOL.

One of the chief advantages of the position of Canada as a self governing colony of the British Empire is, that any one desiring to leave the Mother Country and seek fortune elsewhere, may settle down in it without being compelled to suffer the wrench which all must experience who may be compelled to transfer their allegiance to a foreign power, and accept institutions and modes of life widely different from those of the "old country." Canada has profited largely from this connection politically, socially, commercially, and in other ways, but in no way has she received greater advantages than in education. Many of her best educationists in the past, and not a few of her most successful teachers at the present day, have received their training in the schools and universities of England, Ireland and Scotland. Ireland has done her fair share—perhaps, indeed, more than her share—in this respect; and it is to her that Canada is indebted for the able educationist whose career is briefly sketched in the present issue.

Mr. MacCabe may be described fairly, if somewhat paradoxically, as a young man, but an old teacher—for, though but little over thirty-five years of age, he has been actively engaged in the exercise of his profession for no less than twenty-one years. He was born in County Cavan, in the North of Ireland, of a good old Catholic family, in January, 1848. His father was one of the most successful and enthusiastic teachers of the justly celebrated "National" schools of Ireland, and enjoyed a very high reputation in and around the vicinity in which he taught. Mr. MacCabe may thus be said to be "to the manor born", he was literally born in the profession, and he has never shown any desire to depart from it. Probably it was owing to the careful early training received in his father's school, and to the contagion of that father's example, that the desire arose in him so early to excel in the same profession; but, at all events, the natural bent of his mind—the ambition to become an instructor of his fellow-beings—displayed itself at a very early age. At that time the "Monitorial System" prevailed largely in the "National" schools (which correspond to our public schools),—a system which may be briefly described as follows. In any school, if any of the pupils from fourteen years old and upwards exhibited special ability and marked aptitude beyond his

fellow, he might be appointed as "paid monitor," and assist in carrying on the work of the school, while prosecuting his own studies at the same time with the help and supervision of the master. In the "District" Model Schools such a pupil might subsequently serve an apprenticeship to the analogous "pupil teacher" system in vogue in schools of that class. It is not our purpose to enquire into the working of either of these systems, on the merits of which public opinion cannot yet be said to be altogether decided. But this we may say, that however bad a system of education may be in itself, there will always be some few "born teachers" who will succeed in spite of every difficulty, by sheer force of natural aptitude and love for the profession—and this has undoubtedly been the case with the subject of our present sketch. Receiving

the appointment of "paid monitor" at the very early age of fourteen years, he, even then, gave proof of unusual fitness for the arduous profession of a teacher, no less by his skill in imparting instruction than by his almost precocious tact in the management of the children entrusted to his charge. It will thus be seen that he entered on his career as an educationist at an exceptionally early age; and we may add that the profession which he thus adopted in his boyhood has never since been intermitted or abandoned. Having finished the usual "monitorial" course of four years, he was promoted to the "District" Model School, where he completed the usual "pupil teacher" term of one year, to the entire satisfaction of the authorities and teachers. His position at this point of his career may, *mutatis mutandis*, and notwithstanding his long apprenticeship in subordinate capacities, not unfairly be compared to



that of a teacher holding a third class certificate under our own system. He was now qualified to accept the responsibilities of a "teacher," and after a brief tenure of the position of assistant teacher, he was offered and accepted the position of Head Master of one of the "National," or public schools, in which capacity he succeeded in winning "golden opinions from all sorts of men."

Subsequently, he entered the celebrated Dublin Normal School,—an institution which has, perhaps, done more than any other school that could be named to advance the cause of popular education, by constantly furnishing a supply of teachers thoroughly drilled and trained in all the best and most modern methods of imparting instruction. It used to be, and we believe it is still, the custom at the Dublin Normal School, to select out of the graduating

class such teachers as have displayed unusual ability and peculiar aptitude for their profession, and to form therewith a "Special Class," to receive an additional year's training, so as to qualify them for any of the higher positions in the profession; and it was Mr. MacCabe's good fortune to be one of the chosen few so selected, and to pass an exceedingly brilliant and successful examination on the completion of the "Special Class" extra year's training.

During his Normal School career he exhibited, what so many of his countrymen have done, a marked love and appreciation of the beauties of our noble English tongue; and on the completion of his course, he was at once appointed to the distinguished position of Head English Master of the Diocesan Seminary at Belfast. Subsequently he filled similar positions in the similar Diocesan Institutions of Kilmore and Killarney; and we need only say that his success in each of these places, was sufficiently great to induce the authorities to make strenuous efforts with a view to securing his continued services.

But about this time, he, in common with many others, began to realize the capabilities of our then infant Dominion; and seeking for himself and family a wider sphere than was offered in his own dear "land of the Shamrocks," notwithstanding that he had then Matriculated into the Catholic University of Dublin, he determined to abandon his chances (and in his case, they might be called certainties) of University success, and to throw in his lot with his kinsmen in British North America. Before leaving Ireland, however, he passed a most successful examination for the position of Her Majesty's Inspector of National Schools, the highest examination on the "National" School programme; and to the few teachers in our midst who object to the length and number of subjects of Examination for First Class Certificates,—which qualify for similar positions in our Ontario Public Schools—we may say that the corresponding examination in Ireland lasts for some fourteen days, and embraces a variety of subjects not included in our less extensive curriculum.

In June, 1869, Mr. MacCabe became a citizen of the Dominion, and took up his residence at Truro, in Nova Scotia. The Mathematical Mastership of the Nova Scotia Normal School was then vacant, and he was immediately appointed to that position; but a short time afterwards, on the promotion of the English Master to the post of Principal, and his then assuming charge of the Science department, Mr. MacCabe was, at his own request, transferred to the more congenial position of English Master. In this capacity he succeeded in giving the most unbounded satisfaction to the Educational authorities, and to the public at large. It is not the least exaggeration to say that his success as a teacher of English, in all its branches, is to this day a "household word" in Nova Scotia. During his career in the Truro Normal School, he published a text book on English Grammar; and, notwithstanding the changes in methods and modes of treatment of this most debatable of all subjects, his book still retains its firm hold on the public of Nova Scotia as the best, as it is the only authorized, work on English grammar in that province. No stronger proof could be given of the exceptionally high estimation in which its author was, and is, held as a teacher in this most difficult branch; and when we consider that this high reputation was gained in the short period of six years, for that was the extent of his stay in Nova Scotia, we must endorse the opinion of his Irish admirers that he is in every respect thoroughly qualified for the position of teacher, but especially of the English branches.

It will be remembered that on the completion of the Ottawa Normal School, in 1875, it was universally conceded that justice demanded the appointment of at least one of our Catholic fellow-countrymen to a mastership in the new institution; and the late Chief Superintendent, Dr. Ryerson (who possesses, in common with the 1st Napoleon, the late Duke of Wellington, the late President Lincoln, the present Earl Beaconsfield, and other great organizers, the rare faculty of appointing, in every instance, the right man to the right place), at once accepted the proposition of appointing Mr. MacCabe, whose abilities were well known to him and the Council of Public Instruction, to the important position of English master in the new Normal School. Of course there were some few who croaked and predicted that the appointment would be unsatisfactory, and especially so since the complexion of the staff made it absolutely necessary for the new English master to be appointed to the position of Principal also. Time, however, tries all things; and the unprecedented success which has attended the Ottawa Normal School since Mr. MacCabe was transferred from the English mastership at Truro to the corresponding position, with the Principalship, at Ottawa, has triumphantly vindicated

the action then taken by the Chief Superintendent and the late Council of Public Instruction.

Entering on a competitive career with the old and well established Normal School at Toronto, the Ottawa School had somewhat exceptional difficulties to encounter; and it must have been a cause of proud satisfaction, not only to the Principal and his able staff, but also to Dr. Ryerson and his late associates in the Council of Public Instruction, to learn that on his visit to the Ottawa Normal School, a few short months ago, the Minister of Education was able to say, "The school here has done its work as well as the one at Toronto." No higher praise than this could possibly be given to a young institution, and none more gratifying to the Principal and staff.

Last year the University of Ottawa did itself and him the honor of conferring the degree of M. A. on Mr. MacCabe, an act whereby it at once acknowledged his special fitness for the position he at present so ably occupies, and its acceptance of him as representative of Catholicism in the branches of superior education. His former pupils unanimously agree that he possesses in a very marked degree the qualities of suavity and firmness so essential in the Principal of an Educational Institute, no less than the tact and ability so requisite in a trainer of those who intend to adopt teaching as their profession. He has filled every possible grade of a public teacher's career, beginning with the subordinate position of "monitor," and rising to his present exalted position as Principal of one of our Normal Schools. In every position he has succeeded in giving the utmost satisfaction, and there is every reason to believe that his success in the future will correspond with the past career which has raised him at such an early age to the proud position which he now fills with such success and approbation.

Gleanings.

CALISTHENICS IN PUBLIC SCHOOLS.

Bodily exercises greatly increase the activity of the lungs. They cannot, therefore, be truly beneficial to the whole system unless carried on in pure air.

Where there are open grounds convenient to the school, the practice should be performed in the open air, except when the weather is inclement.

The second choice would be a spacious hall, well lighted and ventilated.

Corridors may in some cases suffice, where no strong draughts of air strike the pupils.

It is not advisable to use class rooms, unless the air in them has for some time before been purified by thorough ventilation. It is a fact much to be regretted, that notwithstanding the strictest rules and orders, teachers will very frequently neglect the ventilation of the rooms to which they are accustomed.

Wherever a better arrangement can be made, it is not advisable to have the pupils exercise between the seats in class-room, because this does not allow of natural and graceful motions and positions, which are desirable, although of secondary importance.

If the exercises are carried on in-doors, the temperature should be 60—65° Fahrenheit (=15—18° Centigrade).

During the practice the windows must be open (but not so as to create a direct draft), and closed again immediately when it is terminated.

Children should be impressed with the advantage of loosely fitting clothes to the ease of the movements and a healthy circulation of the blood; tight lacing ought to be discouraged.

The exercises should at first be gentle, increase in force during the lesson, and then gradually diminish, so as to leave the system in as nearly a normal condition as possible at the close of the lesson, in order to avoid taking cold. But all the movements must be vigorous.

The time ordinarily set apart for play and recreation must in no case be used for the Calisthenic exercises.

Systematic physical exertion requires mental concentration as does any other study. It is the opinion of all rational physicians and educators that the pupils ought to be allowed a few minutes of liberty, to relax their nervous tension, between each two lessons of any kind, and Calisthenics should be no exception.

No apparatus is required for this class of school-exercises. Still, where there are no objections to the necessary appropriations, light

clubs, dumbbells, wands, etc., may be used to give more variety in the higher grades of schools.

Care should be taken by the instructors that all parts of the body receive a proportionate amount of exercise, it being the main object of Calisthenics to conduce to the HARMONIOUS DEVELOPMENT of body and mind in the course of education.

Ease and grace in attitude and movement, the dexterous use of the limbs, the healthful circulation of the blood, the increased activity of the skin, the expansion of the chest, and the increase of muscular power can, each by itself, only be considered means to the one great end.

Strength and agility are equally desirable for the average individual of either sex: so are beauty, propriety, and decency. Hence there can be no good reason for making a distinction between the exercise for boys and girls; it is even demonstrable, that many exercises which are generally omitted in Calisthenics for girls belong to those which would prove most beneficial to them in their future maternity. Especially where a lady instructs a class of girls, it would be but necessary to apply the ordinary tact in individualizing, as temporary conditions of pupils must in all cases be taken into consideration.

The gradation of exercises must keep pace with the children's physical development; and since this differs in the different schools and different sections of the country (for instance the Northern and the Gulf States), the exercises must vary accordingly.—*Board of Directors of the Gymnastic Seminary, Milwaukee.*

A LITTLE FALSE SYNTAX.

1. "We have no *corporeal* punishment here," said a schoolmaster. *Corporeal* is opposed to *spiritual*. Say *corporal* punishment. *Corporeal* means *having a body*.

2. "He *rose up* and left the room;" leave out *up*, as it is absurd to say *rise down*. The Irishman who was *hoisted down* the coal pit did not observe this rule.

3. "*Set down* and rest yourself;" say *sit down*; *setting* is said of the sun in the west, but cannot be properly applied to a person taking a seat. "*Sit down*" is not improper, though "*rise up*" (as in No. 2) should never be used. *Sitting down* expresses the act of appropriating a chair, while *sitting up* means *sitting erect*. *Sitting up* also refers to watching during the night with the sick.

4. "This is a secret between *you and I*;" say *you and me*. The construction requires the objective case in place of *I*, which is in the nominative.

It is in still better taste to say, "This is a secret between *you and me*."

5. "Let *you and I* take a walk;" say, Let *you and me* or, Let *us*. Who would think of saying, Let *I* go? The expression "Let *I and you*" is frequently heard, which contains the additional inpropriety of putting the first person before the second.

6. "Thompson was there *among the rest*." This mode of expression, which is very common, literally declares an impossibility. The signification of "the rest" is, those *in addition* to Thompson, and of which Thompson formed *no part*; he could not therefore be among them. A more correct form would be, "Thompson was there *with the rest*."

7. "The *two first* cows are the fattest," said a farmer at an agricultural fair. He should have said, "the *first two*;" there can be only *one* that is *first*—the other must be necessarily the *second*.

8. "I prefer the *yolk* of an egg to the white;" the more common word is *yolk*, with the *l* sounded; but if *yolk* is used it should be pronounced like *yoke*.

9. "He is quite *as good as me*;" say, *as good as I*. Also, instead of *as good as him*, say, *as good as he*. In both these instances *am* or *is* must be mentally supplied at the end of the phrase, to suggest the meaning; and the pronouns should, therefore, be in the nominative case.

10. "How do you like *these kind* of pears?" say, *these kinds*; a noun in the singular number will not allow its adjective to be in the plural.

11. *Benefitted*; often spelled *benefitted*, but *incorrectly*.

12. "Who do you think I saw yesterday?" say, *Whom*.

13. The following equivocal notice is said to swing out on a sign-board somewhere in the western country. "SMITH & HUGGS SELECT SCHOOL.—Smith teaches the boys, and Huggs the girls." Huggs needs correction.—*Five Hundred Mistakes Corrected.*

SPELLING.

Spell *woodderuff fee*? was one of the orthographical puzzles of my school boy days. The initiate shouted back in sing-song tone and order:

Double-u, double-o, double-d, e;
K-u-double-f, f-double-e!

to the great wonder and admiration of the greenhorns.

And how we *did* spell in those days!

Teacher (*Hearing spelling lesson*.) Indivisibility!

A. I, n-In; d, i-di, Indi; v, i, s-vis, Indivis; i-i, Indivisi; b, i, l-bil, Indivisibil; i-i, Indivisibili; t, y-ty, Indivisibility! Screaming it out at the top of his voice.

Teacher. Circumnavigation!

B. C, i, r-Cir; c, u, m-cum, Circum; n, a, v-nav, Circumnav; i, i, Circumnavi, g, a-ga, Circumnaviga, t, i, o, n-tion, Circumnavigation. And then the blunderheads and impibuses!

Teacher. Aaron!

C. Big A; little a, r, o, n-ron, Aaron!

Teacher. Sharon!

D. Big Sha; little sha; r, o, n-ron, Sharon!

Switch. Whir-r-r-ra! Whir-r-r-ra! Whir-r-r-ra!

D. Boo-hoo-hoo-hoo!

Teacher. Excavate!

E. E, x-Ex; c, a-ca, Exca; v, a, t, e-vate, Excavate!

Teacher. Define the word!

E. To *holler* out!

Teacher. Use it!

E. The baby *excavates* when he gets hurt!

Switch. Whir-r-r-ra! Whir-r-r-ra! Whir-r-r-ra!

E. Boo-hoo-hoo-hoo!

Teacher. Forefather!

F. F, a-Fa; t, h, e, r-ther, Father; One father: F, a-Fa; t, h, e, r-ther, Father; Two fathers: F, a-Fa; t, h, e, r-ther; Father; Three fathers: F, a-Fa; t, h, e, r-ther, Father; Four fathers.

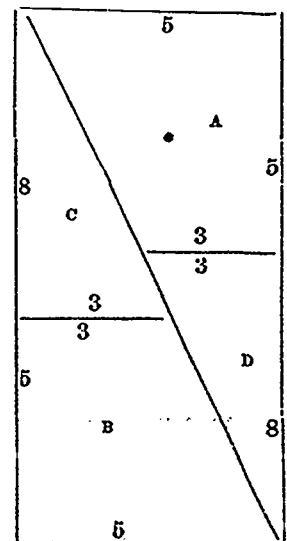
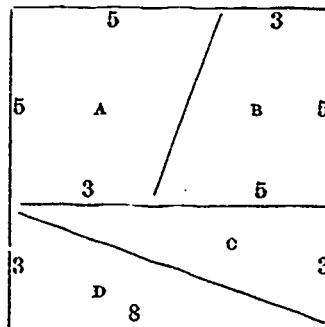
Switch. Whir-r-r-ra! Whir-r-r-ra! Whir-r-r-ra!

F. Boo-hoo! I don't—Boo-hoo! See how—Boo-hoo! a man can have—Boo-hoo! four fathers—Boo-hoo! any more—Boo-hoo! than four mothers!—Boo-hoo-hoo! But that is the way to spell four fathers. Boo-hoo-hoo-hoo!

And so on—to the end of the lesson and throughout the term.

Oh! those days, those days, these days of *blue-backs*, *hickories* and *chinquapins*—of *toeing lines* and *turning-down* and *going-up*—of *fears* and *tears* and *hardships*, which have all long since been erased from memory's tablets—of *love*, and *fun* and *play* and *study* and *innocent mischief*, which will ever live in sweetest green and freshness.—*John M. Richardson, in Barnes' Educational Monthly.*

A MATHEMATICAL PUZZLE.



Cut out a piece of pasteboard just 8 inches square. Of course it contains just 64 square inches. Now cut into 4 pieces, as indicated by the following diagram. Cut carefully, with as much accuracy as possible. Now replace these four pieces as indicated by the next diagram. This arrangement of the pieces gives a parallelogram 5x13 inches, which, of course contains 65 inches. Where is the fallacy?—*N. E. Journal of Education.*

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Extract from letter received from Hon. J. W. SIMMONDS, State Superintendent of Public Instruction, New Hampshire.

Some weeks since I received the June No. of your Journal, at my home, Franklin, N.H., in answer to a request. That was a very valuable and instructive number. I read it with much interest. I ask you to send me the subsequent numbers, and enrol me as a subscriber.

Recommended by the Minister of Education for Ontario.

Recommended by the Council of Public Instruction in Quebec.

Recommended by the Chief Supt. of Education for New Brunswick.

Recommended by the Chief Supt. of Education, British Columbia.

TORONTO, OCTOBER, 1878.

PRIZES.

Prize giving in Schools is as popular in Canada as in any part of the world. Many prominent educators, however, including several of those in our own country, deprecate the giving of prizes, and regard the custom as violating one of the fundamental principles of psychology. Nothing, indeed, seems to strike the intelligent educator from foreign lauds, when visiting English or Canadian Schools, so forcibly as the extent to which prizes are given in them.

The general popularity of the system makes it all the more necessary that we should carefully consider the correct basis on which to grant the prizes. If given at all, they should certainly be given with the view of making not only their recipients, but every one competing for them, better and nobler citizens. They should reward perseverance and industry rather than smartness. They should be given in such a manner as to enable every member of a class to compete as nearly as possible on equal terms. Dr. Wiese, in his German Letters on English Education, says: "Of all the contrasts which the English mode of thinking and acting shows, none has appeared to me so striking and contradictory as the fact that a nation which has so great and sacred an idea of duty, makes no use of that idea in the school education of the young; it has rather allowed it to become the custom, and it is an evil custom, to regard the prospect of reward and honour as the chief impulse to industry and exertion." Alexander Hamilton once said to a friend: "Men give me credit for genius. All the genius I have is just this, when I have a subject on hand I study it profoundly. Day and night I explore it in all its bearings. My mind becomes pervaded with it. Then the effort which I make is what the people call the fruit of genius. It is the fruit of labour and thought." Is it not possible to give prizes so that they will stimulate in the performance of duty, and develop and encourage the patient performance of laborious effort which must be the prelude to genuine success? Can prizes not be earned instead of won? A very good answer to these questions will be found in the Regulations of

the New Brunswick Board of Education, published in the Official Department of the present number of the JOURNAL. Teachers will also find a very suggestive article from the pen of Dr. Rand in the May number, which should be read in connection with these Regulations.

THE WORK OF TEACHERS OUT OF SCHOOL.

When a teacher takes charge, for the first time, of a school in a rural district, he finds the people possessed of a certain average intelligence. If he is fitted for his position his own intelligence is considerably above this average. One of two things always follows. The teacher either sinks to the intellectual level of the people of his section, or he raises them up to his own. Unfortunately, it is too often the case that the former is the result. The teacher enters so heartily into the amusements, social gatherings, and tea parties of his new empire, that he has no time left for the improvement of his own mind or the minds of those around him. He usually has an advantage over the other young men whom he meets, in style, an untanned face and smooth hands, and, unfortunately, too many of the fair sex regard these as indications of a higher culture, so that he frequently becomes the most popular young gentleman of his district. The only others who can compete with him on anything like equal terms are the young minister, the music master in the winter season, or the clerk in the nearest store. One of these is occasionally a thorn in his side. Under such circumstances, it is perhaps natural that many a young man, whose aims are not very definitely settled should prefer to be the hero of a "quilting bee" rather than the leader of a literary society; and ability to chatter pleasantly with the gossips of the neighbourhood, rather than an acquaintance with the great intellectual questions of the day. The only literary efforts made by many such teachers are writing letters to certain fair ones, or replying to letters of invitation to tea, and in both cases they prefer to write in accordance with the rules of some ten cent "letter writer," rather than in harmony with the rules of Bain.

Such teachers are but poorly performing their duty. They may go over lessons with the children each day, but that is a small part of what they might do, and ought to do, to elevate the moral and literary tone of the sections in which they reside. Unless he does so, he is sure to grow narrow and stagnate, and gradually sink into insignificance. Teachers should become more and more the directors of the people. Social and political life is too much under the control of the sewing society, on the one hand, and the village tavern or corner grocery on the other. If the people are to be allowed to vote they must continue to grow in intelligence, general or special, or they will be more and more at the mercy of the worst demagogues. If the people are to develop in right directions, teachers will have to be their leaders after as well as during school age.

There is a great deal of work for the teacher to do that is not on the authorized course of study. What this extra work

is, and how it can best be done, is one of the most important educational questions of the day. The *JOURNAL* aims to help in settling it, and will continue to urge it upon the attention of teachers throughout the country. Teachers and others are requested to offer brief suggestions, through its columns, regarding the best means of establishing and conducting debating societies, literary societies, reading circles, evening classes, libraries, &c. The first thing to be done is to attend to the reading of the country. To change much that is now done, and to supply reading matter for those who do not now read at all. The Editor of the *Pacific School and Home Journal*, in urging this question, says: "We once heard Anna Dickinson say that there was but one good way to save human souls—and that is to 'out-bid the devil for them.' So in this case—if the thousands of young men who now, rapidly and surely, are led to ruin, are to be saved and led to a better and more useful life, it must be by offering them something better, more ennobling than the 'grog-shop.'"

"We repeat it—let a library be established in every little village. A library not merely where books are kept to be taken out once a week; but a place where young and old, parents with their sons and daughters, may meet every evening for conversation, and song and reading. A place to which a young man may go with anticipation of refined and ennobling pleasures, and from which he may seek his couch with a clear conscience."

—"The Superintendent now says: 'We have excellent courses of study, the best of school books, clean and comfortable school rooms, earnest and faithful teachers, an active and progressive committee,' and we predict we shall have most successful schools the coming year."

So speaks a New Hampshire paper of Superintendent Simonds, and his schools. The prediction made will undoubtedly be verified. The five points of excellence named cover the whole ground. The first question is settled in Canada. The second is also pretty definitely and satisfactorily fixed. Certain limits are laid down within which local authorities may exercise options. The other three are in the hands of the people themselves, and our advice to them is, if you have not already secured the fifth requisite, "an active and progressive committee, or trustee board," get it next January, and you may rest assured that the third and fourth clauses of the above quotation will receive attention. Select your wisest and most liberal men as school trustees.

—The report of the Provincial Teachers' Convention held in August can be obtained from the Secretary, James Hughes, Public School Inspector, Toronto. The price is only ten cents. Inspectors and others should order early, as only a limited number of copies are printed. Several associations have passed resolutions ordering a copy for each of their members. This practice should be more common. Every county association ought to be affiliated with the Provincial Association, and purchasing copies of the Provincial Report would be one means of securing this end.

Contributions and Correspondence.

ENGLISH LITERATURE AND ITS PLACE IN POPULAR EDUCATION.

BY FRANCIS H. UNDERWOOD, A.M., AUTHOR OF "HANDBOOK OF ENGLISH LITERATURE."

The place which the study of literature should hold among other scholastic pursuits is hardly doubtful. While other studies are pursued mainly for discipline, literature is at once a means and an end of culture. Language is the most marvellous instrument of human thought; and its study employs our noblest and strongest powers, as well as our most subtle perceptions and refined tastes; and in literature, as the appropriate end of linguistic studies, we derive the highest pleasures of which our natures are capable.

Literature is a part of the world's history, and, in many respects, the most important part. The rise and fall of dynasties, and the changes in forms of government, are chiefly important on account of the light they throw on the progress of political science, and the hope they give of the advance of mankind towards justice and equality. But the real life of a nation is preserved in its literature; and the student who is familiar with the personal memoirs, letters, plays, and songs of any era, has a better knowledge of the character and condition of the people than all the formal histories can give him.

Instruction in English literature should go on with other branches in equal step. Any well-disciplined child of fourteen years (and perhaps less) is ready to receive judicious lessons in this department. For this purpose it is not necessary to begin with Chaucer, nor to follow any rigid rule of chronology. Bacon and all the philosophers, and Taylor and all the theologians, may be reserved for maturer years; but the teacher can take works of acknowledged merit that are capable of being easily understood, and lead his charge through pleasant fields, until, by imperceptible degrees, they reach the heights. When they have been accustomed to notice peculiarities of style and modes of thought, and have, in other respects, sufficient maturity of mind, they can trace the development of language historically, and view the treasures of our literature as in a moving panorama.

It will be advisable, in all cases where the means allow, to read certain works entire. Thus Shakespeare cannot be profitably studied by means of selections; but the best of his plays should be read from Hudson's or Rolfe's editions. No separate scenes are either satisfactory or instructive. Other works may be named for thorough reading, such as Milton's "Comus," Goldsmith's "Traveller" and "Vicar of Wakefield," Lowell's "Vision of Sir Launfal," Longfellow's "Evangeline," Whittier's "Snow-bound," Emerson's "May Day," and one or two of Tennyson's "Idyls of the King."

But all educators know that the cases in which complete works of this kind can be procured in sufficient numbers for the use of a school will be exceptional. And, in any event, it will be desirable to supplement this course with some volume of selections arranged in historical order, and containing the necessary biographical, critical, and linguistic notes. The benefit of such a course of instruction introduced into the grammar schools, and continued in the high schools, would be incalculable. The teacher would make a daily study of the author from whom the lesson was to be taken. He would fill out the narrow outline of the biography. He would illustrate and refine upon the critical estimates, giving his own views, and stimulating the pupils to examine for themselves, and to form habits of independent judgment. It is doubtful whether

any branch of instruction would yield more certain and more abundant fruit.

In my boyhood I never, by any accident, had my attention directed to the beauties or excellencies of English literature. "Paradise Lost" was used only for the odious exercise of parsing; and the noblest lines of Milton are to this day connected with the pattering of conjugations and declensions. No more effectual way could be taken to disenchant the student than by breaking the lines, as upon the wheel, and analyzing the still quivering members by the dull rules of syntax.

In a few modern schools, English literature receives attention, but they are generally high schools. The bulk of our children, however, never reach the high school; and, if they did, there is no reason why the study should not be taken up earlier. Abolish the profitless reading of scrap-books, and let each day's reading be given, in turn, to some branch of natural science, to history, and to literature. The elements of good reading are few and simple; and these can be attended to as incidents. If special practice in elocution is desired, the teacher can make use of a work like that of Lewis' "How to Read." Each pupil will show by his voice and manner whether he appreciates what he is reading. The cultivation of natural and proper tones, the adaptation of manner to the style—as in narrative or descriptive prose, and in humorous, pathetic, or dramatic verse—will come naturally, under the skilful teacher's care.

There cannot be too much reading of good authors. No one ever became an elegant or even a correct writer by following the precepts of grammarians, or the prim examples of literary Pharisees. A knowledge of the structure of our language and the natural relations of its parts, the power of using appropriate imagery, the nice discrimination between apparent synonymes and the easy, fluent motion in which thoughts roll on, can only be acquired by long and intimate acquaintance with the works in which these traits are exemplified.

Experience has proved that even young pupils take up these courses of reading in literature as well as in science with avidity. In schools where they have been introduced, no exercises are so eagerly anticipated or so thoroughly enjoyed.

A WORD WITH SCHOOL TRUSTEES.

The time is rapidly approaching when engagements between trustees and teachers will have to be made for next year, where they have to be made at all. It may not be out of place, therefore, to offer to school boards a little friendly advice, based on a long course of experience and observation in school matters. I take for granted that all trustees who accept the office do so with the intention of discharging its duties with an eye single to the best interests of the school and the boys and girls in the neighbourhood, who depend on it for whatever education they are to receive. The responsibility devolving on a school trustee is no light affair. To my mind, the liability to heavy penalties for neglecting the duties specified in the text of the school law and regulations is the smallest part of it. He has it in his power to make or mar, to a very great extent, the future of the children of his village or section. He can, by carelessness or false economy, deprive them almost entirely of the benefits of a sound and liberal education, just as he can by strict attention to his duties and enlightened liberality confer upon all who like to avail themselves of it, the inestimable boon of a good educational outfit. I would like to be able to believe that all trustees feel their responsibility and act accordingly, but as my present object is to offer advice and not inflict a lecture, I urge upon you:—

1. *To engage your next year's teacher as soon as possible.* There are good teachers and bad teachers, and you may depend upon it that, in spite of the great progress we have made during the past few years, the bad still far outnumber the good. It is easier to hit upon an inferior teacher than a superior one, and the longer you leave off making a choice the greater is the chance of your failing to make a good one. The best teachers are always sought after. They have a local reputation, if not one still more extensive. They do not require to search for a good school, for a choice of good schools is thrust upon them. Trustees wiser than you, if you keep putting the matter off, will step in ahead of you, secure the very man you had in your mind's eye, and leave you a choice between none at all and one you know to be unworthy of the high trust you are compelled to repose in him. Choose then at once, but choose deliberately and intelligently.

2. *Choose for your teacher a well-educated man.* It is a great mistake to suppose that because there are in your section no children beyond the third class, a third class teacher is good enough for you. A third class teacher is not well enough educated for any school if a second or a first class teacher can be procured. The higher a man rises in the ranks of educated men the more active and vigorous, as a rule, he will be found, and activity of both body and mind are absolutely essential to success in teaching. And then how can a third class teacher prepare to advantage third class candidates; and if there are a few boys and girls in the neighbourhood anxious to prepare for something higher than third class, how are they to get the necessary training? Every teacher who is worthy of the name will rise through the various grades just as rapidly as possible, and if you get one with a low certificate, try to make sure that he is at all events one who is not contented with his station.

3. *Choose one who has shown that he knows how to impart his knowledge to others.* Visit the man of your choice in his school. See him at work for a considerable time, and at different times. Notice his methods of instruction in the various subjects of the programme. Observe whether he can keep the attention of his class fixed on the work, and whether his pupils are compelled by his skill to follow him in his prelections. Judge for yourself whether he thoroughly comprehends what he is trying to teach, and whether he is making the children comprehend it too. Notice whether he has to fall back on clap-net devices to secure attention, or whether there is visible either in himself or his little hearers the kindling eye that indicates enthusiasm in the work. If he is cold and lifeless his class will be the same, and you can safely pass him by, whatever his literary qualifications may be.

4. *Choose a man who has a good moral character, and is capable of exercising a good moral influence.* He must be a thorough disciplinarian, but his dominion over his little subjects must be based on moral and intellectual superiority, not on brute force. A good teacher can govern any school without constantly resorting to corporal punishment, and if on visiting a school you see the switch laid out so as to be easily reached in an emergency have nothing to do with its owner. If a teacher must keep a rod for the child's back he ought at least to keep it out of sight, and use it as rarely as possible. Do not get one who smokes or chews tobacco, or is afflicted with any other bad habit you would like to see kept from spreading in the school. No teacher can afford to check in his pupils what he practises himself, for they cannot be deceived.

5. *Choose one who will never forget that he is a man and a gentleman, either in the school room, at the family fireside, or in society.* Shun fops as you would blockheads, in fact the terms are often synonymous. Let the man of your choice be one who can exercise self-control, and who will never allow a hasty or a vulgar expression to pass his lips.

6. Finally, when you have found one with proper qualification, do not try to get him for nothing. Do not ask him what salary he wants, but offer him fair and liberal terms. If he can do better elsewhere, do not let a few paltry dollars stand in the way of the children's welfare. Their future success in life may depend to a great extent on the choice you are now making, and this thought should never be absent from your mind. You may be denounced by the ignorant, the selfish, or the unthinking as extravagant. Pay no attention to such criticisms. The discharge of your duty to those entrusted to your care is of far more importance both to you and to them.



COMPOSITION.

BY GEO. K. POWELL, TORONTO.

Composition, in the sense in which we use the term in schools, means the expression of our own thoughts in writing. I wish to extend it to the expression of our thoughts in spoken as well as written language. A great many people who talk tolerably well profess themselves unable to write a letter or an essay. The reason is, not that they lack either the ability to write or the knowledge of what to write, but they have not written often enough. We learn to do a thing well only by doing it often, and those who write seldom need not expect to write well. This idea will point out to the teacher a method of lessening this trouble, i.e., frequent practice in writing down one's own thoughts.

I shall in this paper try to indicate some of the means at the disposal of teachers by which the composition of pupils in our schools can be improved, and thus the composition of the future men and women.

In order to write well two things at least are indispensable, viz., the possession of ideas and the expression of them in language. Both are necessary. With the former I shall deal but little, as it falls within the province of education generally to impart knowledge, train the observation, and develop a taste for reading—these being the chief means of getting ideas. To express our thoughts well in language, we must have observed very closely the different ways of expressing the same idea, so as to be able to choose the best. Then we must have a full and ready memory, and be able to select the best form of expressing the same idea. Generally, then, the teacher can best prepare his pupils to write well by teaching them to observe closely in their reading the way in which a thought is expressed, suggesting other modes, or having the pupils suggest them, getting their opinion as to the best, and finally giving his own opinion with reasons. Something can be done in this direction even before the pupil can read well.

The children who enter the lowest classes of our schools have some knowledge of words, and can compose, whether correctly or not will be determined by the correctness of the language they have heard used by their parents, playmates and others. They learn to speak by imitating the sounds they hear, and it is not likely the imitation will be more perfect than the model. When the pupil's language is incorrect, and I think it generally is, it can only be improved by the good example of the teacher, and constant care on his or her part to correct *wrong expressions*, i.e., vulgar or ungrammatical expressions, whenever they are heard. In addition to this the child should be required to repeat frequently the correct form, so that both ear and tongue may be familiar with it. Some children, however, are so timid and retiring that the teacher seldom hears them speak at all. I think these should be encouraged to talk by familiar questions on the various objects they see in the school-room, on their way home, &c. The reading

lesson is a valuable help in this exercise, not only in the lower classes but in all, as by it the pupils gain a knowledge of a large number of new words. These require to be thoroughly explained to the pupil, so that they really become "signs of ideas" to them, and not merely empty forms and sounds. During this explanation, which can best be given by means of familiar questions and answers, the pupils are connecting the words they are learning with those already known, and are thus improving their ability to compose. Care is here necessary in wording questions, so that the answers may be complete sentences, and not isolated words.

When pupils can write—which in our schools would be in the seventh, possibly eighth division—they may be required to write on slates the answers to the familiar questions on their reading lesson and other subjects. Occasionally they should be asked to write something on some easy subject, such as the "dog," "horse," "street," "school," &c., one sentence being sufficient. Before they write the teacher should ask them a few questions on the subject, to supply some of the class with ideas, for all will not be able to write even a single sentence, and many will not be conscious that they know anything to write. After the sentences have been written, the teacher should look over the slates and point out errors in spelling and language. During the pointing out of errors, the blackboard may be profitably employed for writing the mis-spelled words, so that the eyes of the pupils become accustomed to the *written form* of the words. As many of the criticisms as possible should be heard by the class; a large number, however, must be criticized privately by the teacher in going round to examine slates. For the purpose of impressing the correct mode of expression, the sentences should of course be re-written correctly. I think in these classes I would require the use of only one capital letter, viz.: the pronoun "I," which is so frequently mis-spelled in writing (shall I say?) by children. For future use, I should ask them to observe in their reading the difference between a letter at the beginning of a sentence and elsewhere. This may be done with advantage with children in the ninth and tenth divisions. There is no time for composition on the time-table of seventh and eighth divisions, but grammar is taken twice a week in seventh. At one of these times composition might be taken with advantage. Composition, and the application of grammar to writing and speaking, is of far more importance than a merely theoretical knowledge of grammatical rules and of parsing.

In the fifth and sixth divisions, the written exercises may be extended to the writing of several sentences about the thing chosen as subject: the teacher, as before, asking a few preliminary questions to make the pupils certain that they know something of the subject. The pupils then write on books a few sentences on the subject, care of course being taken in the penmanship as well as in the composition. The books are then collected, afterwards examined by the teacher, and the errors marked. In marking, the best plan is to underline words and phrases which are wrong, and refer to the particular kind of mistake by certain characters placed on the margin. I think the best marks for that purpose are those recommended in *Dughes' Composition Blanks*. At next composition time, the teacher writes a few sentences on the board containing the most common errors made by pupils, and by a few questions gets the class to criticize them, and with very little real help they will generally correct the mistakes. In this way I think the teacher will best *teach* the proper form of words, and impress it on the minds of his pupils. After about half the time has been spent in this manner, the pupils re-write their compositions, making the necessary corrections as indicated by the marks in the margin.

In order to give practice in letter-writing, probably the most

important branch of composition, I would advise the occasional writing by each pupil of a "letter of criticism" addressed to the teacher, in which letter he criticizes a *composition* of some other pupil. To prepare the pupil for this, the teacher shows the class the usual forms of letters, as to date, heading, address, subscription, &c., and also writes one or two on the blackboard. These should be marked in the same manner as compositions, and correctly rewritten. The pupil may also be required to write letters to friends on familiar subjects, such as "How they spent some holiday," an account of some visit to a place of amusement, such as the park, gardens, &c., and what they saw there.

In addition to regular composition, there are some very profitable exercises in connection with the grammar lessons of the pupils. A number of simple statements written on the blackboard may be combined into one simple sentence, as in the following: John Smith lost some pencils. They were long pencils. They were slate pencils. Combined, these become: John Smith lost some long slate pencils. Short sentences containing adverbial phrases may be combined in the same manner, as—Columbus sailed from Spain. He sailed in 1492. He sailed across the Atlantic Ocean. When the pupils are acquainted with the Relative pronouns, they may combine sentences similar to the following into a complex sentence containing a relative clause: Milton was blind. Milton wrote "Paradise Lost." Milton who wrote "Paradise Lost" was blind. As soon as they know the kinds of verbs, require the pupils to form sentences containing Tran. Act. verbs, and then change to sentences containing Tran. Pass. verbs. When the pupils understand the participles, which will probably be in the fourth division, they may be practised in combining several short statements by the use of the participles.

The converse of this exercise may be employed with advantage, viz., the breaking up of a sentence containing several attributes into simple statements. In order to teach the pupils the important art of making compound sentences, and not short abrupt statements, as children are so apt to do at first, a number of simple sentences connected in sense may be written on the blackboard, and combined into one compound sentence by the pupils, using appropriate conjunctions. Similarly, the formation of complex sentences may be taught, as in the following: Shakespeare flourished in the sixteenth century. Elizabeth was then Queen of England. One simple sentence containing attributes may be changed to a complex sentence by changing adjectives and adverbs into clauses. The complex sentence I have just read may be obtained from this simple one: Shakespeare flourished in the sixteenth century during the reign of Elizabeth, Queen of England. Again, these and similar complex sentences may be changed to one or more simple ones.

Another useful exercise is the change of direct to indirect narrative, and *vice versa*. All exercises similar to those I have mentioned, requiring the pupil to apply his knowledge of the principles of grammar in the formation and change of sentences, are I think very valuable. And now I will suggest a want in the matter of text-books, notwithstanding the number we already have, viz., a book of exercises similar to those I have indicated. In my opinion such a book would very materially aid the teacher in teaching composition.

I do not venture on any suggestions with respect to higher forms of composition, requiring a knowledge of figures of speech, &c., neither have I made many suggestions on teaching composition in the higher classes, although no doubt the same methods may be adopted as in the lower, with the exception of exacting a higher standard of excellence.

In concluding these remarks, I cannot refrain from saying that

composition depends, after all, on the intelligence of the reader. If a pupil understands the exact force of the words and phrases he reads, very little teaching will enable him to write well; if not, no amount of teaching the forms of sentences, &c., will make him even a passable writer. I would therefore recommend, as a direct aid to the teaching of composition, careful attention to the understanding of the meaning of words by the pupils.

Mathematical Department.

Communications intended for this part of the JOURNAL should be on separate sheets, written on only one side, and properly paged to prevent mistakes.
ALFRED BAKER, M.A., EDITOR.

SOME FACTS IN THE HISTORY OF ALGEBRA.

Almost all authorities agree that the word 'algebra' is Arabic in its origin. De Burgo—one of the earliest European writers on the subject—derives it from Arabic words signifying restitution and comparison; others obtain it from Geber, a celebrated Arabian philosopher, to whom the invention of this department of knowledge is ascribed. As would naturally be supposed, the first steps in the science were due to attempts to extend and generalize ordinary arithmetic. In the earliest works the two subjects were mixed in such a way as plainly to indicate the intimate relation in which they were supposed to stand to one another. De Burgo calls algebra the greater art, to distinguish it from ordinary arithmetic, which is called the lesser art; and much later, Newton defines algebra as universal arithmetic, for which, however, he is taken to task by Comte, who considers that the two subjects differ in the point of view from which they regard quantities, which in algebra are considered as to their *relations*, in arithmetic as to their *values*. Algebra is the calculus of *functions*; arithmetic the calculus of *values*. In a philosophic view of mathematics, aided by advances made since Newton's time, we can scarcely hesitate to agree with Comte; but it is equally true that Newton expressed not only the view entertained in his time, but also the then position of the sciences.

At first the characters used were mere abbreviations of words. Thus, *p* and *m* denoted *plus* and *minus*. Says Playfair, "The first appearance of algebra is merely that of a system of short-hand writing, or an abbreviation of common language applied to the solution of arithmetical problems. It was a contrivance to save trouble. The scientific language, therefore, has grown up slowly from a very weak and imperfect state."

The oldest work extant is that of Diophantus, of Alexandria, who flourished about 150 years after Christ. His book is a collection of problems relating to square and cube numbers, with their solutions. His investigations do not extend beyond quadratic equations. He denotes the powers of quantities by the initials of their names. Thus *x* denotes the cube (*кубос*), and *xx* the sixth power. The rule is laid down that minus multiplied by minus gives plus, but minus multiplied by plus gives minus. Minus (*λβι*, *↓*) is denoted by *↓* inverted, but no special sign is used for plus.

Hutton, who gave much attention to the early history of algebra, and careful consideration to the respective claims of Hindoos, Arabians, and Greeks, to being the first inventors of the science, expresses the opinion that the algebra of the Arabs is quite different from that of Diophantus, and not taken the one from the other: that if the Arabs did learn from the Hindoos, as is most probable, they did not borrow largely from them; and that the Hindoos were further advanced in some branches of this science than the modern Europeans, with all their improvements, till the middle of the eighteenth century. It is certain that the Italians

derived their knowledge of algebra from the Arabians; and either they or the Spaniards were the first to introduce the study into Europe. Strachey, an Oriental scholar of the beginning of this century, furnishes an analysis of an Arabian work in which the ordinary index law is set forth, and methods are furnished for the solution of various forms of simple and quadratic equations, methods identical with those we employ at present.

Leonardo, a merchant of Pisa, acquired while in the East a knowledge of the art, and about 1202 wrote a treatise. His manuscript was never printed, though it is described as "orderly and regular, teaching and demonstrating all the rules, and illustrating them with many examples." In this no notation such as we use was employed; both the quantities and the several operations were expressed by their names, or words at full length. Diophantine problems are treated of, and equations as far as quadratics. His solutions of quadratics are based on geometrical considerations, and it may satisfy the curiosity of some to give the following: To solve $x^2 + ax = n$; here $x = \sqrt{\frac{1}{4}a^2 + n} - \frac{1}{2}a$. For take any straight line AB greater than $\frac{1}{2}a$, and on it describe the square $ABDE$. From BA , BD cut off BC , BF each equal to $\frac{1}{2}a$; through C and F draw CGK and FGH parallel to AE and AB respectively. Let AC denote the required quantity x . Then CF will be $\frac{1}{2}a^2$, HK will be x^2 , and AG , GD will each be $\frac{1}{2}ax$. Hence the whole square $ABDE$ will be $x^2 + ax + \frac{1}{4}a^2$. But $x^2 + ax = n$. Therefore $ABDE = n + \frac{1}{4}a^2$; and its side AB will be $\sqrt{n + \frac{1}{4}a^2}$; and $x = AB - BC = \sqrt{n + \frac{1}{4}a^2} - \frac{1}{2}a$.

The first printed treatise on Algebra was that of Lucas de Burgo, a Franciscan, who seems to have been instructed in the science in both Italy and the East. His first work was printed about 1470. He gives names to the various powers of the unknown. Thus *co.* or *cosa* is the thing or first power of the unknown; *ce.* or *censo* the product or square, &c., and n^2 or *numero*, the known number; *p* stands for *plus* or *minus*, *m* for *meno* or *minus*. Thus where we would put $8 - 4x + 7x^2$, he would write $8n^2 m. 4co. p. 7ce$. He treats of the solution of simple and quadratic equations, of higher equations that may be resolved into quadratics, of surds, their addition, subtraction, multiplication, and division, and of the extraction of the square root of binomial surds.

These facts exhibit the state of algebra among Europeans about the beginning of the fifteenth century. They could solve simple and quadratic equations, using only positive roots, and one unknown; their marks and signs were only abbreviations of words, or the words themselves; and they confined themselves to resolving certain numerical problems. The next great advance is that with which the name of Cardan is usually associated, and consisted in the solution of cubic equations. The circumstances attending the discovery of this solution are amongst the most curious in the romance of science. About 1508 Ferrei, a professor of mathematics at Bologna, had devised a means of solving a particular class of these equations, and, jealous of his discovery, had communicated it to but a few even of his own pupils. One of these, Florido, vain of his knowledge, challenged Tartalea of Brescia to a contest, in which each was to propose to the other thirty questions, and he who first effected the solution of his opponent's problems should win thirty treats for himself and friends. Tartalea appears to have possessed no inconsiderable mathematical power, for he completely defeated Florido, extending his solution of cubics to classes which neither he nor his master had been able to resolve. Cardan at this time was a physician and lecturer in mathematics at Milan; having heard of Tartalea's discoveries, and being about to publish a large work on mathematics, he desired to obtain them in order to add them to his treatise. And now began a series of intrigues worthy of mediæval Italians.

Cardan first applied to Tartalea through a third person, offering services and friendship, but in vain. He next sought him by letter, but only obtained the roots of certain equations without the methods of finding them. Not to be beaten, Cardan approached Tartalea again, promising to use influence in his behalf with a certain nobleman resident in Milan, a patron of men of learning, whom he represented as being desirous of seeing him. Hope of patronage, or fear of giving offence in case of non-compliance, at length drew Tartalea to Milan, and, the nobleman being absent from the city, he was induced to remain three days at the house of Cardan. Here the latter at length obtained the rules without the demonstrations, not, however, without the most earnest entreaties and solemn oaths never to disclose the information. Cardan soon discovered for himself the demonstrations, and solved additional cases that had resisted the attacks of Tartalea, who in turn had recourse to various devices to obtain from Cardan these fresh discoveries. A violent quarrel ensued, which culminated in Cardan forgetting his oaths and promises, and publishing a treatise on cubic equations. Such were the circumstances attending this most important advance in the theory of equations. Posterity will readily forgive the offence, and laugh at the quarrel. The episode, however, is instructive as illustrating the curious, selfish view with which even scientific knowledge was regarded during the middle ages. Cardan effected the complete solution of cubic and biquadratic equations. He showed that the even roots of positive quantities are either positive or negative, the odd roots of negative quantities real and negative, and the even roots of negative quantities impossible. He knew that the number of positive roots is equal to the number of changes of sign; that impossible roots enter in pairs; how to form an equation having given roots; and how to transfer an equation so as to want a particular term. He frequently used letters to denote quantities. Mathematicians were then accustomed to put their rules into verse; Cardan followed the fashion. We need not be surprised to learn that the versification was awkward. The object of this custom was to assist the memory, an object much more effectually attained by the subsequent introduction of a literal notation, and of signs and symbols.

MANIFOLD SPACE.

The following remarks on Manifold Space, from the inaugural address of Mr. Spottiswoode, President of the British Association, will be of interest to many of our readers:

It may first be remarked that our whole experience of space is in three dimensions, viz., of that which has length, breadth and thickness; and if for certain purposes we restrict our ideas to two dimensions as in plane geometry, or to one dimension as in the division of a straight line, we do this only by consciously and of deliberate purpose setting aside, but not annihilating, the remaining one or two dimensions. Negation, as Hegel has justly remarked, implies that which is negated, or, as he expresses it, affirms the opposite. It is by abstraction from previous experience, by a limitation of its results, and not by any independent process, that we arrive at the idea of space whose dimensions are less than three.

It is doubtless on this account that problems in plane geometry, which, although capable of solution on their own account, become much more intelligible, more easy of extension, if viewed in connection with solid space, and as special cases of corresponding problems in solid geometry. So eminently is this the case, that the very language of the more general method often leads us almost intuitively to conclusions which, from the more restricted point of view, require long and laborious proof. Such a change in the base of operations has, in fact, been successfully made in geometry of two dimensions, and although we have not the same experimental data for the further steps, yet neither the modes of reasoning, nor the validity of its conclusions, are in any way affected by applying an analogous mental process to geometry of three dimensions; and by regarding figures in space of three dimensions as sections of figures in space of four, in the same way that figures in plane are sometimes considered as sections of figures in solid space. The addition of a fourth dimension to space not only extends the actual properties of

geometrical figures, but it also adds new properties which are often useful for the purposes of transformation or of proof. Thus it has recently been shown that in four dimensions a closed material shell could be turned inside out by simple flexure, without either stretching or tearing; and that in such a space it is impossible to tie a knot.

Again, the solution of problems in geometry is often affected by means of algebra; and as three measurements, or co-ordinates as they are called, determine the position of a point in space, so do three letters or measurable quantities serve for the same purpose in the language of algebra. Now, many algebraical problems involving three unknown or variable quantities admit of being generalised so as to give problems involving many such quantities. And as, on the one hand, to every algebraical problem involving unknown quantities or variables by ones, or by twos, or by threes, there corresponds a problem in geometry of one or of two or of three dimensions; so on the other it may be said that to every algebraical problem involving many variables there corresponds a problem in geometry of many dimensions.

There is, however, another aspect under which even ordinary space presents to us a four-fold, or indeed a mani-fold, character. In modern Physics, space is regarded not as a vacuum in which bodies are placed and forces have play, but rather as a plenum with which matter is co-extensive. And from a physical point of view the properties of space are the properties of matter, or of the medium which fills it. Similarly, from a mathematical point of view, space may be regarded as a *locus in quo*, as a plenum, filled with those elements of geometrical magnitude which we take as fundamental. These elements need not always be the same. For different purposes different elements may be chosen; and upon the degree of complexity of the subject of our choice will depend the internal structure or mani-foldness of space.

Thus, beginning with the simplest case, a point may have any singly infinite multitude of positions in a line, which gives a one-fold system of points in a line. The line may revolve in a plane about any one of its points, giving a two-fold system of points in a plane; and the plane may revolve about any one of the lines, giving a three-fold system of points in space.

Suppose, however, that we take a straight line as our element, and conceive space as filled with such lines. This will be the case if we take two planes, *e.g.*, two parallel planes, and join every point in one with every point in the other. Now, the points in a plane form a two-fold system, and it therefore follows that the system of lines is four-fold; in other words, space regarded as a plenum of lines is four-fold. The same result follows from the consideration that the lines in a plane, and the planes through a point, are each two-fold.

Again, if we take a sphere as our element we can through any point as a centre draw a singly infinite number of spheres, but the number of such centres is triply infinite; hence space as a plenum of spheres is four-fold. And, generally, space as a plenum of surfaces has a mani-foldness equal to the number of constants required to determine the surface. Although it would be beyond our present purpose to attempt to pursue the subject further, it should not pass unnoticed that the identity in the four-fold character of space, as derived on the one hand from a system of straight lines, and on the other from a system of spheres, is intimately connected with the principles established by Sophus Lie in his researches on the correlation of these figures.

If we take a circle as our element, we can around any point in a plane as a centre draw a singly infinite system of circles; but the number of such centres in a plane is doubly infinite; hence the circle in a plane form a three-fold system, and as the planes in space form a three-fold system, it follows that space as a plenum of circles is six-fold.

Again, if we take a circle as our element, we may regard it as a section either of a sphere, or of a right cone (given except in position) by a plane perpendicular in the axis. In the former case the position of the centre is three-fold; the direction of the plane, like that of a pencil of lines perpendicular thereto, two-fold; and the radius of the sphere one-fold; six-fold in all. In the latter case, the position of the vertex is three-fold; the direction of the axis two-fold; and the distance of the plane of section one-fold; six-fold in all, as before. Hence space as a plenum of circles is six-fold.

Similarly, if we take a conic as our element, we may regard it as a section of a right cone (given except in position) by a plane. If the nature of the conic be defined, the plane of section will be inclined at a fixed angle to the axis; otherwise it will be free to take any inclination whatever. This being so, the position of the vertex will be three-fold; the direction of the axis two-fold; the distance of the plane of section from the vertex one-fold; and the direction of that plane one-fold if the conic be defined, two-fold if it be not defined. Hence, space as a plenum of definite conics will be seven-fold, as a plenum of conics in general eight-fold. And so on for curves of higher degrees.

This is in fact the whole story and mystery of manifold space. It is not seriously regarded as a reality in the same sense as ordinary space; it is a mode of representation, or a method which, having served its purpose, vanishes from the scene.

Absence from the city prevented us from acknowledging the receipt of solutions of problems in the August number of the JOURNAL

—of 1, 2 and 3, by Mr. Armstrong, of Woodham; of 2 and 3, by Mr. Jones, of Brentwood; of 1 and 2, by J. M., of Oshawa; and of 2, by Mr. Shaw, of Kemble.

A solution of 3 not having appeared, we give the following by Mr. Paris, the proposer:

$$\begin{aligned} \frac{1}{6} \text{ of 6 lbs.} &= 1 \text{ lb. at 65 cts.} = \$0.65 \\ \frac{1}{2} \text{ of remainder} &= 4 \text{ lbs. at 70 cts.} = 2.80 \\ \text{residue} &= 1 \text{ lb. at 75 cts.} = 0.75 \\ \hline 6 \text{ lbs. sell for} & \quad \underline{\$4.20} \end{aligned}$$

1 lb. sells for 70 cts. at a gain of 40 p. c. \therefore 1 lb. costs 50 cts. $\frac{1}{2}$ of an oz. is $\frac{1}{2}$ of a lb. Hence loss is $\frac{1}{2}$ of $\frac{1}{6}$ of the tea, or $\frac{1}{12}$ of the tea. Also the gain is the advance of 5 cts. on 70 cent tea, or a gain of $\frac{1}{14}$ of it. \therefore gain = $\frac{1}{14}(\frac{1}{2} - \frac{1}{12}) = \frac{1}{105}$ of the tea; and loss is $\frac{1}{12}$; \therefore net gain = difference = $\frac{1}{105} - \frac{1}{12} = \frac{1}{105}$ of tea. And this gain is $2\frac{1}{2}$ lbs. at 50 cts. = 2 lbs. at 70 cts. (Reducing to 70 cts., because 70 cts. was previously used as the money equivalent of 1 lb.) \therefore $\frac{1}{105}$ of tea = 2 lbs., or whole number of lbs. is 3864.

PROBLEMS FOR SOLUTION.

1. *ABC* is a triangle, having the angle at *C* a right angle; the angle at *A* is bisected by a straight line which meets *BC* at *D*, and the angle at *B* is bisected by a straight line which meets *AC* at *E*. *AD* and *BE* intersect at *O*: shew that the triangle *AOB* is half the quadrilateral *ABDE*, using Book I., Euc., only.

J. M., Oshawa.

2. Let it be required to raise a given weight *W* to a given height *BC*, along an inclined plane *AC*, by means of another given weight *P*, connected with the former by a flexible rope *WCP*, moving over a pulley at *C*. Find the tension of the rope, also the inclination and length of the plane, so that the time of the whole ascent may be the least possible.

G. SHAW, Kemble.

3. *ABC* is a triangle; prove that the resultant of the forces represented by *2AB* and *AC* is represented by *3AD*; *D* being a point in *CB* taken at $\frac{2}{3}$ the way from *C* to *B*.

R. R. COCHRANE, Ottawa.

J. M.—You are right,—the problem is not correct.
“Latitudinarian.”—Your solution is correct.

Practical Department.

CONVERSATIONAL COLUMN.

The Editor of the Practical Department will be glad to send forms of application and other information to those teachers and others who desire to become members of the Chautauqua Literary and Scientific Circle, explained in the last number of the JOURNAL.

I was taught that a concrete number should never be used as the multiplier of an abstract number. For instance, in finding the price of oranges at 3 cents each, I would not regard it as correct for my pupils to multiply the 7 by 3, but ‘vice versa.’ Now, I notice that in the new and very valuable Elementary Arithmetic published by Messrs. Kirkland and Scott, they have in many instances fallen into the error of indicating that an abstract number should be multiplied by a concrete number.

Hamblin Smith, in his definition of the sign of multiplication, says that it implies that the second of the two numbers is to be multiplied by the first, Art. 23. His mode of expressing 4 times 67 is 4×67 ; \times = TIMES. As the Elementary Arithmetic is intended to be an introductory text-book to H. Smith's Arithmetic, the authors adopted his definition of this sign, Art. 39, and hence such

cases as you cite do not bear out your statement that in many instances they have used concrete numbers for multipliers, as 8×10 cents must read 8 times 10 cents.

I have heard that the Public School Board of Boston has adopted an entirely new school programme. Please state the changes made.

The programme is "new" to Boston; but programmes based on similar principles have been adopted before in other cities, in Europe and America. Henceforth in the primary schools instruction is to be almost entirely oral. Pupils will learn from objects and from the teacher instead of books. An exercise known as "Language" will consist of oral lessons upon pictures, plants, animals and what else the teacher may consider useful in leading pupils to express what they know in words. Oral instruction will also be given upon form, color, measures, animals grouped by habits, vegetables, minerals, hygiene and the human body. The metric system will be taught from the metric apparatus. No spelling books will be used at all, the reading books taking their place. In the higher grades the study of grammar, as generally studied, has been abolished with the spelling book. In the stead of parsing and other technical work, lessons will be given in composition, in the use of capitals, in letter writing and in the arrangement of sentences. This is the change most needed in Canada. It is time at least that we taught grammar with the view of enabling pupils to "speak and write the English language correctly," which is our professed object. Much of the time formerly devoted to geography will be given to natural philosophy and physiology.

FEATURES OF APPLETON'S NEW "READERS."

General Method. The system adopted may be called eclectic. It is a combination of the "word" and "phonic" methods, with a larger share of the latter. The first three lessons in the primer are taught by sight only, and consist simply of words and phrases. The fourth lesson is divided into two parts, "finding sounds" and "making a word." So through the primer sight and sound go hand in hand in enabling the pupil to learn to read in the shortest and simplest possible way.

Grouping Phrases. Every teacher who has taught primary classes knows the evils which arise from allowing children to "sing" their words separately. They naturally give as much emphasis to a, the, of, in, etc., as to larger words, and pause as long after them. This does more to give them an unnatural method of reading than any other single cause. It takes years of careful effort on the part of good teachers in the higher grades to undo the evil done in this one way by the careless primary teacher. But the most careful teachers of the junior classes using tablets, or books printed in the usual way, have found it to be a most difficult task to teach their pupils to group words in reading them; to say, "on the road," for instance, as one word instead of three independent words. The authors of these Readers have, in the first part of their primer, grouped in a simple manner phrases which should be "run together" in speaking. Such combinations of words as "a hat," "in her hand," "my red dress," are enclosed by lines thus: | a hat | ; | in her hand | ; | my red dress | . Would it not be well for teachers of primary grades to mark their tablets in a similar manner, with ink and a brush pencil, or with a crayon pencil? If the first twenty tablets were so marked it would be a great benefit to both teachers and pupils.

Finding Sounds. This exercise commences the fourth lesson given to a child. The word "rat" has already been presented to him, and he can name it by sight. He finds the fourth lesson printed thus:

1. RAT
2. R — A — T
3. R — — A — — T
4. R A T

The word "rat" is first sounded in the proper manner. The teacher then asks his pupils to listen carefully while he sounds the same word slowly, as represented by line two. After sounding (not spelling) it slowly two or three times, the pupils imitate him, until they all do it correctly. He then sounds the word and separates the sounds (not letters) still more, as in line three. The class follow him. When he has reached line four the sounds are so widely separated as to be quite independent of each other. The pupils will thus readily learn that what seemed to them to be one sound is really made up of three distinct sounds, each sound represented by a certain mark or letter. They should not yet know the names of these letters.

Making a Word. This exercise is exactly the reverse of the last, and forms part of the same lesson. The word is printed in parts first, which are gradually sounded more nearly together until they are combined in the one sound "rat." The exercise is indicated thus:

- R A T
- R — — A — — T
- R — A — T
- RAT

The sounds in line one should be separated entirely, that is, the sound of r should cease altogether before the sound of a begins, &c. In the other lines this should not be done. The sound of one letter should be continued until the sound of the next commences. They should be drawn out and attached to each other, so as to form a word spoken in a drawling manner. Then by gradually reducing the space between the sounds the word "rat" is at length formed, when the sounds are brought together so closely, that the distance between them cannot be further reduced.

Naming the Letters. The alphabet, as a whole, comes on the last page of the primer, instead of the first. It has, however, been presented to the pupil in parts before he reaches the end of his first book. Three or four letters are presented to him occasionally to be named, not sounded. These three or four are, of course, the letters that he has previously been sounding. Thus, the learning of the alphabet in the old sense is sandwiched in as a "side issue," having no direct bearing on teaching reading. The large and small forms are presented for naming at the same time.

Language Lessons. The authors urge upon teachers the importance of giving what may be termed "oral language lessons," in connection with the reading lessons. What a small opportunity a child usually has of speaking to its teacher in school? If a child converses daily with correct speaking parents at home, it becomes an accurate speaker, and grammar lessons are, to a considerable extent, superfluous as far as it is concerned. It is not enough that it should hear its parents talk correctly. It must itself talk with them, and have its little errors promptly and kindly corrected. The teacher ought to take the place of the intelligent and correct-speaking parent, in this respect, for every child in his school. By the child should talk freely and frequently with the teacher. He should express his own thoughts in his own language; and this will afford his teacher an opportunity of correcting his errors of language and style. For this reason the authors recommend that the children be led to talk about the things and scenes represented in the beautiful pictures with which the Readers are illustrated. They are not to do this, as some seem to think, merely that they may be interested in what they read, but chiefly as a "language lesson." The importance of such an exercise before a

lesson in reading cannot be over-estimated. Of course the object lessons afford an excellent opportunity for language lessons, but the pictures even in our own primers are more suggestive to children than objects usually are.

Blackboard and Slate Work. It is scarcely necessary to state that the teacher is advised to use both the blackboard and slate in connection with the primer and tablets. The blackboard is of more use in teaching a child to read than the best tablets and primers combined, if it is used properly.

MENTAL ARITHMETIC. IV.

J. A. McLELLAN, M.A., LL.D.

METHODS.

(1) *First Notions of Numbers—Counting.*—As “a good beginning is the half of all,” it is of the highest importance that the child should acquire at the outset clear ideas of numbers, and of the processes involved in the fundamental rules. And further, as our first ideas of numbers are derived from objects of sense, elementary lessons in the science of numbers, as already affirmed, should be given with visible objects. Any objects, as books, pencils, &c., may be used; but for effective use, the *Numeral Frame* is by far the most convenient, and it is hoped that no school in the Dominion is without this simple but essential aid in teaching elementary arithmetic. The youngest child found at school will probably have formed ideas of some of the smaller numbers, though as yet he may know nothing of their names. He may not, for example, have the faintest notion of what is intended to be expressed by the words *two* and *four*; but give him his choice between *two* apples and *four* apples by actually presenting these objects before his eyes, and his prompt decision proves that he has already formed some conception of numbers. Still, as little progress in thought can be made without the use of thought-symbols, it is plain that the child's conception can embrace only very small numbers, and that, from inability to analyze the concept into its elements, his notions are necessarily exceedingly crude. His school-room work, then, in connection with arithmetic, begins with the COUNTING OF OBJECTS; there is first the presentation of visible objects to impart clear notions of numbers, and secondly, the naming of these notions that have been thus clearly, because naturally, formed.

The mere naming of the numbers in consecutive order (*one, two, three, &c., &c.*), without attaching any meaning to the names as representing a certain number of units, is a process by no means rare in the school-room, though it is all but absolutely useless. We know children that can “count” readily as far as fifty, or even a hundred; but ask them to move nine balls on a wire, or place twelve marks on a slate, and if they make the attempt at all they will sadly blunder. Such counting as this, without any reference to the numbers or groups of objects which the names represent, is as worthless an expenditure of time and energy as learning to rush through the names of the letters from A to Z without ever seeing the forms which the names stand for. What then is the true method? We suppose that all know it, though all do not follow it.

(a) Let the teacher, holding up one book, ask the class “How many books do I hold in my hand?” They will answer—or if they do not know they must be taught to answer—one book: in the same way the teacher proceeds with *one* pencil, *one* finger, *one* ball, &c., till his pupils have a clear notion of what the word *one* stands for. Then he proceeds in a similar way with *two* pencils, *two* books, *two* balls, &c., till they know clearly how many objects

the word *two* stands for. And so the teacher goes on, first presenting the groups of objects in the order of the consecutive numbers (*one, two, &c.*), and then in varying order (*three, five, seven, two, four, six, &c., &c.*), till his pupils can not only count from one to ten, but can instantly name any number of objects from one to ten inclusive which the teacher may place before them, and conversely can instantly count off or select the number of objects expressed by any name which may be given them.

There is a difference of opinion among experienced teachers as to what is best to be done after the pupils are thoroughly familiar with the numbers from one to ten. Some prefer to continue the process of counting till larger numbers are mastered; others think it desirable to give the notation of the numbers already learned. Either course may perhaps be followed with advantage.

(b) From our own experience, however, we are inclined to teach next the analysis of the numbers already acquired, in order that the pupils may attain still clearer notions of the values of the numbers, as exhibited in their relations to unity and to one another, while at the same time they are made familiar with some of the operations of the fundamental rules. The teacher, holding up one pencil, asks “how many pencils have I in my hand?” The pupils answer as before, “one pencil.” He then takes another pencil in his hand and asks, “how many have I now?” The answer is “two pencils.” “Then one pencil and one pencil are how many?” Pupils answer “two pencils.” In the same way the teacher shows that one book and one book are two books, one ball and one ball are two balls, &c., &c., till they arrive at the fact that *one* and *one* are *two*. He then introduces them to a different form of expression, showing that instead of saying one and one are two, and two is equal to one and one, we may say *two times* one is two, and two is equal to *two times* one. Then holding up two pencils he asks, “how many pencils have I in my hand?” Pupils answer “two.” He removes one pencil, asking, “how many have I now?” “Then one pencil from two leaves how many?” Removing the remaining pencil, he asks, “how many have I now?” “Then two pencils from two pencils leave how many?” And so on with books, balls, &c. The pupils are thus made familiar with the meanings of the following facts and expressions: one and one are two, two times one is two, one from two leaves one, two from two leaves nothing, two contains one *two times*, one is contained *two times* in two. The teacher then gives some practical problems, as e.g.: I gave one pencil to Harry and one to Willie, how many did I give away? Charles had one cent and Willie had one cent, how many had both together? Charles had two glass alleys, he gave one to his brother, how many had he left? Susie has two cents, and buys pencils which cost one cent each, how many pencils does she buy? I have two pencils, and give one each to a number of boys, how many boys will receive a pencil? And numerous similar questions may be given in addition, subtraction, multiplication and division, until the pupils are familiar with the notions they involve. The teacher then proceeds to a similar analysis of the number THREE. *One* ball, and *one* ball and *one* ball are *three* balls; *two* balls and *one* ball are *three* balls; *one* ball and *two* balls are *three* balls; *one* ball from *three* balls leaves *two* balls; *two* balls from *three* balls leaves *one* ball; *three* balls equals *three times* one ball; *one* ball may be taken *three times* from *three* balls. And so on with books, pencils, &c., till all the ideas involved are clearly mastered. Then, as before, practical questions may be given. John had three apples and gave away two, how many had he left? Mary had two pins and found one more, how many had she then? I gave one cent to each of three boys, how many did I give away? Charles had three peaches, he gave one each to some class-mates, how many class-mates re-

ceived a peach? Mary had three apples, she gave two to her sister and one to her cousin, how many had she left? How many is two times one? Three times one? How often is one contained in two? in three? Jane has three cents, and wishes to buy pens, which cost two cents each, how many can she buy? How much will she have left? &c., &c.

The teacher similarly proceeds with the analysis of the number FOUR. One ball and one ball and one ball and one ball are four balls; four balls are four times one ball; two balls and two balls are four balls; four balls are two times two balls.

(To be continued in next No.)

HOW TO TEACH MENSURATION.

W. J. CARSON, H. M. MODEL SCHOOL, LONDON.

II.
TRIANGLE.

CASE I. To find the area of a triangle when the base and altitude are given.

1. Begin the lesson by giving three or four simple examples in finding the area of a rectangle.

Example. Find the area of a rectangle whose base is 24 and altitude 14.

2. Cut, out of paper, a rectangle whose base and altitude are, say 12 and 8 respectively. Pin it on the blackboard, and have the class find its area.

3. While the rectangle is pinned on the board, cut out of it a triangle whose base is the base of the rectangle, and altitude the altitude of the rectangle. Then lay the pieces which are cut off upon the triangle.

Question the class in the following manner:

Ques. How does the size or area of the pieces compare with the size or area of the triangle?

Ans. The area of the pieces is equal to the area of the triangle.

Ques. How does the area of the triangle compare with the area of the rectangle?

Ans. The area of the triangle is one half the area of the rectangle.

Ques. If you had the area of the rectangle, how would you find the area of the triangle?

Ans. I would take half the area of the rectangle to find the area of the triangle.

Ques. If you had the base of a triangle and the altitude, how would you find the area?

Ans. and Rule. I would multiply the base by the altitude, which would give the area of the rectangle, and then take half of it for the area of the triangle.

Ques. How could you find the area without taking half the product of the base into the altitude?

Ans. I would multiply the base by half the altitude, or multiply the altitude by half the base.

Ques. What would be the area of the rectangle that was pinned on the board?

Ans. The area would be 12 multiplied by 8, which is 96.

Ques. What would be the area of the triangle that was cut out of it?

Ans. The area of the triangle would be the base 12, multiplied by 4 (half the perpendicular), which is 48.

Ques. What are the factors of the area of a triangle?

Ans. The factors of the area are the base and half the altitude, or the altitude and half the base.

Ques. If you had the area of a triangle and the base, how would you find the altitude?

Ans. I would divide the area by half the base to find the altitude.

1. Find the area of a triangle whose base is 64 and altitude 36.

2. Find the altitude of a triangle whose area is 462 and base 42.

3. Find the base of a triangle whose area is 806 and altitude 18.

4. Find the number of acres in a triangular field whose base is 82 rods and altitude 26 rods.

Geometrical proof, Euclid I. 41.

CASE II. To find the area of a triangle when the three sides are given.

Mechanical proof. None.

RULE.

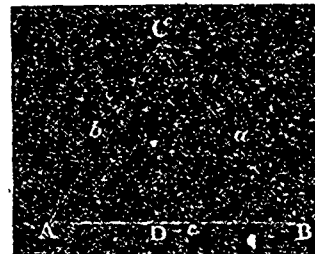
From half the sum of the three sides subtract each side severally; multiply together the half sum and the three remainders, and extract the square root of the product.

DEMONSTRATION.

1. When the three sides of a triangle are given, and a perpendicular let fall from the vertical angle upon the base, to find the segments of the base.

Let a, b, c denote the sides of the triangle ABC ; then, by Euclid I. 47, $b^2 - AD^2 = CD^2$, for the same reason $a^2 - DB^2 = CD^2$; $\therefore b^2 - AD^2 = a^2 - DB^2$ and $a^2 - b^2 = DB^2 - AD^2$, and $(DB+AD)(DB-AD) = a^2 - b^2$.

$$DB - AD = \frac{a^2 - b^2}{DB + AD} = \frac{a^2 - b^2}{c}, \text{ c being } = AD + DB.$$



Therefore $\frac{a^2 - b^2}{c}$ is equal to the difference between the segments DB and AD ; and $c - \frac{a^2 - b^2}{c} =$ twice the shorter segment,

\therefore shorter segment $= \frac{1}{2} \left(c - \frac{a^2 - b^2}{c} \right) = \frac{c^2 + b^2 - a^2}{2c}$.

RULE.

To find the segment of the base, from the square of the base and the square of one of the sides subtract the square of the other side, and divide the remainder by twice the base.

2. To find the perpendicular let fall upon the base.

Euclid I. 47. $AC^2 - AD^2 = CD^2 \therefore b^2 - \left(\frac{c^2 + b^2 - a^2}{2c} \right)^2 =$

$$\frac{4b^2c^2 - (b^2 + c^2 - a^2)^2}{4c^2} \therefore CD, \text{ the perpendicular } =$$

$$\frac{\sqrt{4b^2c^2 - (b^2 + c^2 - a^2)^2}}{2c}$$

3. To find the area.

$$\text{Area by case I.} = \frac{AB \times CD}{2} = \frac{\sqrt{4b^2c^2 - (b^2 + c^2 - a^2)^2}}{4c} \times c$$

$$= \frac{1}{2} \sqrt{4b^2c^2 - (b^2 + c^2 - a^2)^2}.$$

The quantity under the radical sign being the difference between two squares may be resolved into the factors $(2bc + (b^2 + c^2 - a^2))$ $(2bc - (b^2 + c^2 - a^2))$; and these in the same way may be resolved into $(b+c+a)(b+c-a)$ and $(a+b-c)(a-b+c)$.

Hence, if we put S equal to $\frac{a+b+c}{2}$, half the sum of the sides, we shall have $\sqrt{S(S-a)(S-b)(S-c)}$, the area.

Examples.—(1.) Find the segments AD and DB ; and the perpendicular CD ; and the area of the triangle ABC , AB being 14, CA 13, and BC 15. Ans. $AD = 5$; $DB = 9$; $CD = 12$, and area 84.

(2.) Find the number of acres in a triangular field whose sides are 234, 289, and 345 rods.

(3.) Find the number of square rods in a field whose sides are 125, 173, and 216 rods; also find the perpendicular let fall on the base 216, and the length of each segment.

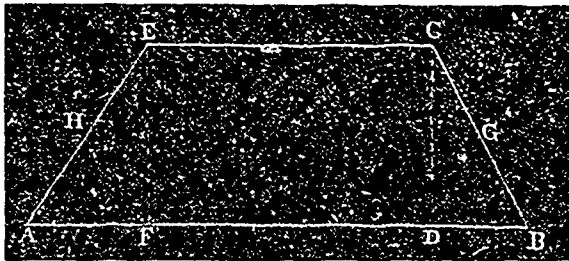
TRAPEZOID.

To find the area of a trapezoid.

(1.) The parallel sides may be given and their perpendicular distance, to find the area.

(2.) The parallel sides and the slant sides may be given to find the area.

Begin the lesson by giving the class two or three simple examples on finding the area of a rectangle, and two or three examples on finding the area of a triangle, the base and altitude being given, for Case I. of the trapezoid; and before beginning Case II., give an example or two on finding the area of a triangle when the three sides are given, and on finding the perpendicular let fall on the base.



Let $ABCE$ be a trapezoid, whose parallel sides EC and AB are given, also their perpendicular distance CD , is given. Mechanical proof:

Cut the trapezoid out of paper and pin it on the black board; through E and C cut off the parts AFE and CDB , leaving $EFDC$ pinned on the board as a rectangle.

Have the class find the area of the rectangle $EFDC$. Then put the two pieces, EAF and CDB (which were cut off), together in the form of a triangle, so that C will be on E , and D on F , and AF and DB in the same straight line.

Now have the class find the area of the triangle. Its altitude is the altitude of the trapezoid or of the rectangle, and its base of course is the difference between the length of the parallel side EC and the parallel side AB . The area of the triangle and the area of the rectangle can be added together for the area of the trapezoid.

CASE II.—When the four sides are given.

Cut the trapezoid out of paper as in Case I. Leave the rectangle $EFDC$ pinned on the board, and form the pieces into a triangle as before. EC and FD of the rectangle will be the same length as the short parallel side of the trapezoid. EA and CB , two sides of the formed triangle, are given, and the base AB of the triangle will be the difference between the parallel sides of the trapezoid.

Now find the area of the triangle, the three sides being known; also find the length of the perpendicular on the base AB , which will be the width of the rectangle. Then find the area of the rectangle, and add the two areas together.

The method of multiplying half the sum of the parallel sides into their perpendicular distance I would not recommend, as it will

only answer for Case I., when the perpendicular distance is given. We are compelled to divide it into a triangle and rectangle when the four sides are given; and both cases can be worked in this way. And I consider that one good general method well impressed will be of more advantage to a pupil on examination day, or in six months or a year after the lesson is taught, than a dozen special methods partly impressed or half forgotten.

The principle of multiplying the half sum of the parallel sides by their perpendicular distance may be taught in the following manner. Through the middle points in AE and BC cut off parts by lines perpendicular to the base AB . Then the pieces can be put on E and middle point of EA , and on C and middle point in CB . The figure then formed will be a rectangle, and its length will be half the sum of EC and AB .

Geometrical proof:—Pott's Euclid, Geometrical Exercise 51, Book II.

Examples. (1.) Find the area of a trapezoid whose parallel sides are 166 and 124, and the perpendicular distance between them 57 feet. Ans. 7980 feet.

(2.) Find the area of the trapezoid $ABCE$, EC being 16 feet; AB , 30 feet; AE , 13 feet, and CB 15 feet. Ans. 276 feet.

(3.) The parallel sides of a trapezoid are 20 and 12 feet, and the other sides are 15 and 17 feet. Required the area of the trapezoid. Ans. 240 square feet.

ANSWERS TO QUERIES.

1. What percentages are required to obtain a First Class A, B, and C?

D. B., Rockton.

No percentages are fixed absolutely. It is necessary to obtain about 70, 60, and 50 per cent., respectively, of the total marks.

2. (a) What percentages are required for 2nd A and B, respectively, at the Intermediate Examination?

(b) What is the minimum required in each subject?

(c) What is the programme in Euclid, Chemistry and Literature?

R. A., Millbank.

(a) 40 per cent. on each group for a 2nd B., and 50 per cent. for a 2nd A.

(b) 20 per cent. for a B., and 30 for an A.

(c) Euclid, I. and II. Books with problems. Chemistry, Flame, Fuel, Atmosphere, Water, Hydrogen, Oxygen, Nitrogen, Carbon, Chlorine, Sulphur, Phosphorus, and their more important compounds. Combining numbers by weight and volume. Symbols and Nomenclature. Literature, Paradise Lost.

3. If Intermediate and Second Class candidates take Latin, may they entirely omit *N. Philosophy, Chemistry and Book-keeping*?

STUDENT, Castlederg.

Yes.

4. May not those teachers who obtained 2nd Class Certificates, grade B., from County Boards previous to 1877 now obtain Second Class grade A., on passing the prescribed non-professional examination for that grade?

STUDENT, Castlederg.

Yes.

5. Must a person, after having obtained an Intermediate certificate, attend the County Model School before he can teach?

SUBSCRIBER.

Yes, unless he has previously taught at least a year. If he has, he is eligible after passing the Intermediate to attend the Normal School to be trained for his professional 2nd.

6. Please give, in the Journal, a List of the Authorized Text Books in English Grammar, Geography, History and Arithmetic for Public

Schools in Ontario. Also, please state if any changes are likely to be made in them.

SUBSCRIBER, Gordonville.

GRAMMAR:—Mason's English Grammar; Fleming's Analysis; and Morris' Grammar (Primer).

GEOGRAPHY:—Campbell's; Calkins, large and small. Lovell's till end of 1878.

HISTORY:—Freeman's European; and Edith Thompson's England.

ARITHMETIC:—Smith and McMurchy's, large and small; and Hamblin Smith's, Canadian Edition.

7. (a) How many years must a teacher teach school before he can superannuate?

(b) How much per year does a teacher, holding a first or second class Provincial Certificate, receive when superannuated?

(c) How should a teacher, having taught ten years previous to 1871 without having paid into the superannuated fund, proceed to secure (when superannuated) the benefit of the fund?

(d) Can a teacher, having taught say 18 years, quit for say 6 years, and then resume teaching till worn out, and receive a pension for the 21 years taught?

H. T. H., Clover Hill.

(a) A teacher may superannuate at the age of 60, or sooner if he can furnish satisfactory proof of disability for continuing in his profession.

(b) The sum received by superannuated teachers is six dollars per annum for each year they have taught in Ontario. Holders of First and Second Class receive one dollar per year additional for the time during which they have held such certificate.

(c) He would have to pay his arrears for the 10 years at the rate of \$5.00 per annum.

(d) Yes, if he has paid his fees during the time he taught, or if he pays his arrears.

8. Should such a combination as "Lord John Russell" be treated separately or collectively in parsing.

S., Ridgetown, N. S.

Collectively.

I hold an Intermediate Certificate, obtained in the summer of 1876, but instead of Chemistry, Philosophy and Book-keeping, I took Latin. Will such a certificate admit me to the Normal School?

H. B. BLYTH.

No.

PERSONALS.

R. K. Orr, M.A., Head Master of Carlton Place High School, has been appointed Principal of Brighton High School.

Miss Maggie McCulloch, of Millbank, has received the appointment of assistant teacher in the Clinton Model School.

Mr. E. L. Byington has been appointed to the English Mastership of the Collegiate Institute, Cobourg.

Mr. Alfred Stunden, of Gananoque, has been appointed English Master in the Stratford High School, at a salary of \$600 per annum.

Mr. William J. Phoenix, of Agincourt, has been appointed head-master of the Public Schools at Markham.

Mr. Ferguson, Inspector of South Grey, was recently presented with a gold watch by the teachers in his district, as a mark of their appreciation of his services.

At the recent matriculation examination of the University of London, the Gilchrist Scholarship of the value of £100 sterling and tenable for three years, was awarded to Mr. Sidney Walker Hunton, of the city of Ottawa.

Dr. Hodgins has been awarded the Gold Medal of the Paris Exposition, for his services in the cause of education in Ontario during the past 34 years.

Dr. Tassio, the able Principal of Galt Collegiate Institute, has returned from an extended tour in Europe, looking all the better for his trip.

Dr. Palmer, Principal of the Deaf and Dumb Institute, Belleville, has been attending a convention of Deaf Mute Instructors at Cincinnati.

Mr. Galbraith has been appointed Professor in the new Provincial School of Practical Science in Toronto.

Four Scholarships were offered for competition in the Toronto Collegiate Institute for 1878. They were given by Mr. Robert Walker, Mr. R. H. Howland, Mr. James Michie and Mr. Warring Kennedy. They were won as follows:—Senior girls, Helen McMurchy and Amy Fell, equal; IV Form, first, Edward Hagarty, second, Frank Boulthec and H. H. Dewart, equal; III Form, first, Wm. H. Smith.

Rev. J. D. Phillips, of Ottawa Collegiate Institute, forms one of the Toronto team against the Australian cricketers.

Prof. Moss leaves Victoria College, to take a professorship in the Wesleyan University at Bloomington, Ill. He will be succeeded by Mr. S. C. Smoke, B.A.

Dr. May, of Toronto, Secretary of the Canadian Commission at the Paris Exposition, has received a diploma for his new method of illustrating natural history.

Wm. Riddell, B.A., B. Sc., LL. B., Professor of Mathematics in Ottawa Normal School, was lately elected Member of the Botanical Society of Edinburgh.

J. B. Caldwell, B.A., after a residence of some time in Rockaway, L. I., has returned to Canada, and is at present teaching in the High School, Windsor, Ont.

Mr. O'Hagan, Separate School teacher, was elected President of the Ontario Teachers' Association at the Separate School Teachers' Convention, recently held at Hamilton.

The Belleville *Intelligencer* says that Prof. Macoun, of Albert College, has been occupied for the past month in arranging and classifying botanical specimens in University College, Toronto. The College authorities have engaged this gentleman for the purpose of getting up an Herbarium for that institution. The Professor furnishes 1,000 specimens of plants from his own collection.

OBITUARY.

One of the prominent educators of Ontario has passed away. Rev. R. A. Fyfe, D.D., Principal of the Canadian Literary Institute in Woodstock, died on Thursday, 29th August. He was born near Montreal in 1816. He received his education and theological training chiefly at Madison University and Newton Theological Seminary near Boston. He was Principal of the Canadian Literary Institute for seventeen years, and his loss will be severely felt, not only by the denomination who sustain the Institute, but by the community generally.

Notes and News.

ONTARIO.

The schools in Lambton, under the efficient inspection of C. A. Barnes, Esq., are beginning to look for libraries, and for this purpose Mr. Sinclair, teacher of S. S. No. 16, Plympton, has just secured a very valuable selection of books.

The High School, Oshawa, seems to be making good progress. Some of the pupils now in attendance are those who secured honors at the University and have returned to do first year work.

The new High School building in St. Thomas was opened on September 6th, with appropriate ceremonies. There are 180 pupils in attendance.

Thirty-four pupils passed the examination for admission to High Schools from the class of Mr. W. J. Carson, Head Master of the Model School London.

The average attendance at the Waterdown High School for the past half year was 66.

The trustees of Listowel public schools have decided to introduce the teaching of vocal music into the schools.

Brantford has twenty-eight teachers, of whom twenty-five are females and three males. It expended \$14,609 for school purposes last year.

The Thorold Mechanics' Institute is to open its reading room and library three nights out of the week during the winter, instead of two as formerly.

The Court of Chancery has decided that the election of school trustees, as well for the Common Schools as the Roman Catholic Separate Schools, must be held by the same returning officer and at the same time and place as the municipal councillors are chosen.

Queen's College, Kingston, has decided to accept the Intermediate High School examination, except that all candidates must pass an additional examination in classics, and the regular work of the college must be taken by all candidates for honors.

QUEBEC.

The Protestant Commissioners of Quebec opened their new school on St. Augustine Street in September, under the charge of Mr. Ferguson. The school is of brick with stone front, and will, when finished, cost \$10,000. It will be a mixed school, but the boys and girls will be taught separately, in accordance with the invariable custom of Quebec.

The school tax on the Protestant Panel (as it is called) of tax payers is this year two cents per 100 on the rental of property—certainly not a very heavy school tax for a city.

The examination of candidates for admission to the study of Medicine was held in Laval University on Thursday and Friday, the 19th and 20th of September. Sixteen candidates only presented themselves. The character of the examination has been materially changed since the Council of the Board of Physicians fixed a definite amount of work on which candidates would have to be examined. The first result of this change seems to have been a decline in the number of applicants for admission.

At the opening of the present session of Laval University the honorary degree of LL.D. was conferred on his Excellency the Governor General, before a brilliant assemblage of the University authorities and of the citizens of Quebec.

The Governor General has requested the photographs of the successful candidates for the medals granted for competition in the various institutions of learning—a request which has gratified greatly those more immediately concerned.

Mr. N. Robertson, from Ontario, has been appointed English master in the Quebec High School.

The most notable feature in connection with education in the Province of Quebec is the apathy of the inhabitants in regard to that subject. Among the French Canadians education is considered a matter which belongs peculiarly to the Church. The laity take no interest in it, believing it well cared for. Among Anglo-Canadians commerce is the all-important interest. No class of young men deem it worth while to think of teaching in Quebec. Indeed if they did the openings are so few that they would probably be disappointed in gaining a situation, and the remuneration is so small that none but those who are unfit to teach would for a moment think of following teaching as a profession. From the notices in the press one would hardly know that any schools existed at all. The duty of the press apparently is confined to the advertisement of the time of school opening. For all practical purposes, and for intercommunication between teachers, the journals of education are useless. And yet one would suppose that the question of education was a vital question for the English minority, whose weight and influence must to a very considerable extent depend upon the possession of those qualities which a thorough education is supposed to give.

NEW BRUNSWICK.

Perhaps the chief interest in educational matters this year centres in the establishment and working of the Teachers' Institutes for the several Counties, and the Educational Institute for the Province. In the August number of this JOURNAL, the Regulations relating to the former were given somewhat fully, one portion, however—that setting forth the object of these Institutes—being rendered almost unintelligible by the transposition of a line in the official "Manual." The correct reading is as follows:—"A Teachers' Institute shall be formed for such Inspectoral District, the exclusive object of which shall be to promote the efficient operation of the means contemplated by the Law and Regulations of the Board of Education for the conduct of all work pertaining to Teachers of Schools."

In nearly every County in the Province an Institute has been organized, and the work done at the first meeting was in every case of a gratifying character, giving promise of most satisfactory results in the future development of the system thus happily inaugurated.

An outline of the proceedings of the St. John Teachers' Institute will serve as a specimen of all the rest. The meeting took place in the hall of the new Victoria School, then recently completed and handed over to the Trustees, to take the place of the noble edifice of similar form and dimensions which stood on the same site before the great fire. About two hundred teachers were present. After a few words of welcome from John Boyd, Esq., Chairman of the St. John School Board,—and introductory remarks by E. H. Duval, Esq., Inspector for the County (since deceased),—Dr. Rand, the Chief Superintendent, delivered an address upon some of the duties, difficulties and dangers of the teaching profession, and upon the aims and objects of the Institute as related to them. Election of officers and other routine business followed Dr. Rand's address. Dr. Coster, Principal of St. John Grammar School, was elected President. There were six sessions, occupying two days. Papers were read on the following subjects:—"The best means of securing regularity and punctuality at school," by Mr. John Montgomery; "School Management," by Mr. O'Reilly; "Reading," by Mr. John March; "How to teach Writing," by Mr. W. Parlee; "The Natural Sciences and their connection with Common School Education," by G. U. Hay. Discussion followed the reading of each paper. There were also discussions, opened by oral addresses, on "Home Lessons," "Spelling," "Spelling Reform," and the "Higher Education of Women." A specimen lesson in Arithmetic was given by Mr. Philip Coss, A.B. At the closing session there were entertaining readings by Miss Denham, Miss Rutherford and Mr. John Boyd.

The "Educational Institute" to which reference is made above, is intended to afford a higher plane for "the professional instruction and culture of its members, and the discussion of educational questions." It also makes an organic nexus between the different branches of the school service, bringing together in an associated capacity the Chief Superintendent and the President of the Provincial University, who are members of the Board of Education, the Provincial Examiners, School Inspectors and Trustees, with Teachers of every grade from the Principals of the Normal, Grammar and High Schools to the humblest holder of a Third Class license.

The leading provisions of the Regulation touching the Educational Institution are as follows:—

1. The Chief Superintendent of Education, the President of the University, the Principal of the Normal School, and the Examiners for Teachers' licenses, are members *ex-officio*. Other school officers not being teachers, and teachers who are members of a Teachers' Institute, may become members by enrolment and payment of such annual fee as the Educational Institute may determine, not to exceed one dollar.

2. There is an Executive Committee, composed of the *ex-officio* members with an equal number elected annually by the Institute from among its other members. This Committee fixes the time for the meeting of the Institute, and has the sole right to determine the programme of exercises, and to recommend or exclude questions for discussion. The funds of the Institute are also placed under the control of the Executive Committee, which appoints its own Secretary-Treasurer.

3. The Chief Superintendent presides at the meetings both of the Institute and of the Executive Committee,—the President of the University or other member of the Committee taking the Chair in his absence or at his request.

4. The Institute annually elects a Secretary and an Assistant-Secretary, who are to keep a record of the proceedings, and to furnish a suitable report of the same for publication in the EDUCATIONAL JOURNAL.

5. The Normal School building and its appliances are placed at the disposal of the Chief Superintendent for the purposes of the Institute,—and it is made the duty of the Instructors to render him all required assistance in connection with the exercises. The student-teachers are required to attend the sessions of the Institute, but cannot become members unless qualified as above.

The Educational Institute was first organized in the summer of 1877, at the close of a Provincial Teachers' Institute held at Fredericton. Its first annual meeting took place on the 13th, 14th and 15th of August last, in the Hall of the Normal School. There were present, first and last, about one hundred enrolled members, besides a considerable number of teachers and others not qualified for membership, and student-teachers to the number of a hundred and twenty. The first session, on the afternoon of the 13th, was opened with devotional exercises, in which the Chaplain of the House of Assembly assisted, and the student-teachers sang their usual opening hymn, followed by a patriotic song. Routine business, including enrolment of members, election of Secretaries, fixing amount of fee, etc., occupied a portion of the first session. H. C. Creed, A.M., was re-elected Secretary of the Institute. An introductory address was delivered by the Chief Superintendent, in which, after referring to the objects sought to be obtained in the formation of Teachers' Institutes, and commenting most favorably upon the work done at all the meetings held in this first year of their existence, he pointed out the high position occupied by the teachers of New Brunswick in respect of professional organization. They were connected organically with the Educational Department of the Province. Peculiar responsibilities devolved upon the members of this Educational Institute, and especially on those who here gave utterance to their opinions and sentiments upon the grave questions which may from time to time be introduced for discussion.

While the Secretaries were engaged in the enrolment of members, Dr. Rand exhibited to the Institute a specimen of the Merit Book, prepared under the direction of the Board of Education, and explained its use. This ingenious piece of school apparatus has been patented.

The work of the remaining sessions was as follows:

SECOND SESSION.—Lecture: "How to Study English Literature," Thomas Harrison, LL.D., Professor of Eng. Literature, Mental and Moral Science in the University of N.B.

Discussion on "The importance of cultivating a taste for healthful reading," opened by W. P. Dole, A.B., of St. John.

THIRD SESSION.—Lecture: "A Course of Instruction," Wm. Crocket, A.M., Principal of the Normal School.

Discussion on the same subject, opened by Ingram B. Oakes, A.B., of Newcastle, North.

FOURTH SESSION.—The members of the Institute visited the museum and library of the University and the Legislative Library. This was a very enjoyable part of the proceedings, and was rendered still more so by the opportunity kindly afforded of conversing by telephone between the residences of the Messrs. Babbitt, and of strolling through the elegant gardens of G. E. Fenety, Esq.

FIFTH SESSION.—The Normal and Model Schools were in operation, and the members of the Institute were detailed in sections for the purpose of observing the work. After the customary opening exercises of the Normal School, in the Hall, at 9 a.m., the several classes proceeded to the different class-rooms, each followed by one of these "sections." Both student-teachers and visitors passed from one room to another in rotation, at the end of each lesson. Four or five lessons were given by each of the Instructors, the time being limited to a half-hour for each lesson.

SIXTH SESSION.—Principal Crocket introduced the following important resolution, which was passed unanimously:—

"Resolved,—That this Institute, while recording its high appreciation of the efforts of the Legislature in behalf of the education of all the people, and of the great educational activity and progress which have characterized the past six years, would hereby express its sense of the vital importance to the school system of the adoption by the Legislature of the Chief Superintendent's recommendations in reference to School Inspection, a Reserve Aid Fund for Teachers, and Secondary Education, as contained in his official reports for 1872, 1874, 1875, 1876 and 1877."

Lecture: "Forms of Energy," by Prof. L. W. Bailey, Ph. D., who illustrated his subject by a series of well-chosen experiments,

among the most interesting of which was the exhibition of the powers of the phonograph.

SEVENTH SESSION.—Paper: "The Conduct of Miscellaneous Schools," H. C. Creed, A.M., Mathematical Instructor in the Normal School.

Discussion on the same subject.

EIGHTH SESSION.—An address to the Lieut.-Governor, the Hon. E. B. Chandler was proposed by the Executive Committee and adopted by the Institute; and a committee was appointed to present the address to His Honor upon his return to Fredericton.

The election of six gentlemen to be members of the Executive Committee, and the answering of questions from the question-box, occupied a large portion of the time at the closing session. Judge Fisher, by request, entertained the audience with reminiscences of the earlier educational history of the Province, in which he himself was a prominent actor. After several votes of thanks, and a few closing remarks from the Chief Superintendent, the Institute adjourned.

On the 13th of September the summer session of the Normal School was terminated by an unusually interesting public examination, occupying the whole day. The Lieut.-Governor was present for several hours, and expressed himself as highly pleased with the exercises.

The semi-annual examinations for license took place in the following week, at Fredericton, St. John and Chatham. There were in all 159 candidates, about three-fifths of them working for second class; among them were 12 college graduates. If the total seems small to our Upper Province readers, it should be remembered that in New Brunswick attendance and professional classification of the Provincial Normal School are pre-requisites to this examination, except in the case of graduates of colleges and persons trained at another Normal School.

PRINCE EDWARD ISLAND.

Much regret is being expressed at the resignation of the Hon. Mr. DeBevis, the Provincial Secretary of Prince Edward Island. As a member of the administration which inaugurated the present public school system, Mr. DeBevis has always taken a deep interest in education. As far as can be seen at the present moment, the school question on the Island has been settled to the satisfaction of all parties, though much has yet to be done in making the administration of the law perfect.

The School Trustees of Charlottetown have made much progress in organizing several new departments within the past year. Next year they will have three fine buildings thoroughly equipped and organized as public schools. The new school, which will accommodate about 600 pupils, is nearly completed on the outside, and will be ready for occupation next summer.

The Prince of Wales' College has been opened for the winter term, the matriculation examination having taken place during the first week of September. In July the examination for scholarships was conducted by Professor Anderson. Mr. Fulton J. Coffin and Mr. Judson Crawford were two of the successful candidates.

Professor W. Borthwick, one of the college staff, has returned to Scotland after a year's residence in Charlottetown. Professor Alexander has returned from Ontario, where he spent his holidays. Mr. Leo Gregor, a distinguished student of the college, has lately entered McGill College, Montreal, for the winter term.

The Normal School has been re-opened for the third term under very favorable auspices. The number of students is over ninety, the largest yet in attendance. At the entrance examination over a hundred candidates took the papers, Mr. George Harris taking the first position in point of merit and Miss Flora Stuart the second. Seven of the successful candidates came from the Cherry Valley Public School, at present conducted by Mr. John McKenzie.

The Boys' High School, under the management of Mr. Samuel Miller, has been doing good work during the past year. At the examination for the Davies' Silver Medal, conducted by Mr. Harper, Principal of the Normal School, Judson Crawford gained the first prize and George E. Robinson the second. At the same examination Miss Bell Longworth, of the Ladies' High School, took the Duncan Silver Medal, and Miss Madge Bear a second prize.

Mr. Ambrose Frazer has been appointed Principal of the Malbeque Public School. Mr. Fraser took a first-class licence at the late Provincial examination for teachers.

The new school at Summerside will be ready in a few months, when we will be able to give an extended report of the reorganization of the schools in town. The trustees have engaged the services of Miss Williams, formerly of Dunstaffuago.

FOREIGN NOTES.

There is a strong agitation going on in England in favor of teaching girls to swim. The matter is being urged on the notice of School Boards.

Four hundred female students will enter the University of London this fall.

New York city has a private swimming school for girls, which is quite liberally patronized. A handsome gold medal was awarded the other day for proficiency.

Each inhabitant in the United States pays \$2.02 for the support of the public schools, and \$1.39 for military purposes. These two items of expenditure in other countries of the world are as follows: Prussia, 51 cents and \$2.29; Austria, 34 cents and \$1.39; France, 29 cents and \$1.50; Italy, 13 cents and \$1.57; England and Wales, 66 cents and \$3.86; Switzerland, 88 cents and \$1.00.

Public schools of St. Louis show an increased enrolment of 3,000 pupils over last year, in a total of 32,000. There are nine colored schools, which exhibit an increase of 200 in a total of 576.

There are about 24,000 common schools in the empire of Japan, with an average attendance of 2,000,000. The course of studies in these schools is somewhat similar to those in America; they have been largely modeled on the American and German plans. There are 216 high schools, of which 103 are specially devoted to the study of foreign languages; the total attendance averages 12,000, but this system has not yet come into general favor. One of the most efficacious helps are the normal schools, 90 in number, which are educating and sending out a new class of teachers. They have at present an attendance of about 8000. Special lecturers have also been appointed to instruct the present common-school teachers, and they have commenced to hold teachers' institutes throughout the empire. The teachers, of which there are about 45,000 of all grades, are licensed by the Government Board of Education.

The Milford, New Hampshire, papers speak as follows of the schools under the supervision of Hon. J. W. Simonds; "These changes have been radical. The old and useless has been lopped off; the new and practical has been introduced. In fact our entire school system has been overhauled and reconstructed. We question whether the history of modern education will show a more thorough overturning and rebuilding of a school system than ours, since our schools have been under the charge of Superintendent Simonds. The beauty of this work is, it has been accomplished in a quiet and harmonious manner. The School Board may be assured that the people will approve of the wise and judicious plan they have pursued. The language of a taxpayer and father, who says that he "cannot afford to have his children use an inferior book or pursue a course behind the times, that he has only one chance to school them, and that he wants the best books and the best course, expresses the popular sentiment."

Teachers' Associations.

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

NORTH BRITAIN.—A meeting of the Association will be held in the Central School, Stratford, on Friday and Saturday, October 25th and 26th, 1878. Programme:—1. Approved Methods of Teaching, G. W. Ross, Inspector of Model Schools; 2. Teaching of English, J. M. Buchan, M.A., Inspector High Schools; 3. Examinations, Wm. Alexander, Inspector Public Schools; 4. Habits of Study, P. S. Davis, B.A., Stratford High School; 5. Means of Discipline, H. Dickenson, County Model School; 6. Professional Study and Reading, Wm. Bothwell, Principal Listowel Central School; 7. Method of Conducting Recitations, G. W. Ross; 8. The Moral Element in Education, Rev. J. E. Croly, M.A., Millbank; 9. Election of Officers; 10. Report of Committee on Constitution; 11. Question Box.

Every teacher in the Riding is expected by the Public School Inspector to be present, and to come prepared to discuss the preceding programme. Schools to be closed on Friday. Exercises to commence at 9 a.m. each day. An entertainment, consisting of Addresses, Readings, &c., will be given on the evening of the first day.

JAS. CROZIER, B.A., President.

H. DICKENSON, Secretary, Stratford P.O.

TORONTO.—The semi-annual meeting of the Toronto Teachers' Association was held in the Public Hall of the Normal School on Friday, September 27. Mr. James Hughes, President, occupied the chair. The first subject, "How to Teach Composition," was opened by Mr. George K. Powell, who read a very practical paper on the subject. A profitable discussion followed, which led to a resolution being adopted requesting the School Board to adopt Swinton's Language Lessons as a text-book. Mr. Adam Morrison followed with a very practical address on map sketching, which he illustrated in a most simple and satisfactory manner. The afternoon session was opened by a very eloquent and exhaustive

address on the "Responsibility of Teachers for Control and Influence." Their great responsibility consisted in the fact that they were forming habits in their pupils by control; habits of action by influence; habits of thought. Biology had shown that any particular action was effected by an operation in an automatic part of the brain structure; that operation repeated developed that part; and the result of the development was a tendency to perform the action. Thus the development of a faculty in a child sometimes became so great that it was exercised independent of the direction of the will. This, in other words, was force of habit, and it indicated the vast responsibility of teachers engaged in the work of fashioning and moulding youthful minds. One important habit that should be developed by control was an implicit submission to constituted authority, for self-reliance in the man grew out of obedience in the boy, whereas waywardness and self-will tended to create the spirit which made a man both a tyrant and a sycophant. Influence implied an internal moving in contrast to external restraint implied by control. It was the direct operation of mind upon mind, either by precept, example, or magnetic sympathy, and it should be remembered that influence was exercised, whether we intended it or not. There was no such thing as morality apart from religion—from the fundamental theistic idea of a controlling being to whom we are responsible for our conduct. A teacher must be up with the times—with the rapid developments in all branches of knowledge, with the political changes, and with the intensely critical spirit that prevailed. A teacher should endeavor to comprehend the nature and mental tendencies of his pupils, also there was great danger of establishing mistaken notions and wrong habits. The spirit of generous competition among pupils, he believed, was productive of good when not carried to excess. In conclusion, he eloquently dwelt upon some of the encouragements which should sustain teachers in their arduous task. After a brief intermission, Mr. F. F. Manly, M.A., of the Toronto Collegiate Institute, read a paper and gave some black-board illustrations of various methods of teaching vulgar and decimal fractions, for which the thanks of the Association were voted to him. The meeting then adjourned till the evening. In the evening J. M. Buchan, M.A., High School Inspector, delivered his admirable lecture on "Poetry and Politics" to a most appreciative audience.

Official Department.

NEW BRUNSWICK.

"The Board of Trustees of any School District is hereby empowered to provide from the School Funds under its control Prizes not exceeding a first, second or third prize, in any School Term, for each School or Department, and according to such conditions and regulations as may be prescribed by the Board of Education, provided that no such Prize shall be awarded in respect of proficiency in particular subjects of the School course, or the discharge of particular School duties."—41 Vict., cap. 35, sec. 10.

In pursuance of the above enactment of the Legislature, the Board of Education has been pleased to prescribe the following conditions and regulations—which are to be carefully observed by Boards of Trustees and Teachers—respecting the offering and awarding of the School Prizes therein authorized:—

1. The offer of the Prizes and the conditions of their award set forth below (in Sections 2 and 3) shall be announced to the School, or department, on or before the first day on which it may be in Session in any Term.

2. The following shall be regarded as the STANDARD for every member of the School:—Prompt attendance at each School sitting; unexceptional conduct while subject to the Teacher's supervision, whether in the School-room or elsewhere; industrious application in the discharge of every School duty; and excellence of scholarship in the subjects of prescribed study, according to the pupil's assignments in the course of instruction pursued in the School.

3. The Teacher shall assign a fixed numerical value to the above Standard, say (5 or 10) for each half day (or for each day), to be available in respect of those pupils only who are present; and the Teacher shall according to his best judgment determine and record at the time what abatement is to be made for any half-day (or day) from this standard figure on account of tardiness, improper conduct, want of application, or imperfect scholarship. At the close of the calendar month the Teacher shall make entry in the School Register (page 6 or 10) of the sum of the standard figures (or parts of them) retained for the month by each pupil, and the aggregate of these monthly entries shall be regarded as the pupil's School Standing for the Term.

4. At the close of the Term the Teacher shall present a written Report, under his signature, to the Secretary of the Board of Trustees, stating (1) the names, with the School Standing for the Term annexed to each, of the pupils having first, second and third positions; and (2) the name of any pupil who, while a member of the School, or department, was unavoidably absent, and whose actual average daily standing being allowed for such days of absence, not exceeding five in any case,

would make his School Standing for the Term equal to that of a pupil whose name shall have been reported in the foregoing statement (1). The Secretary of the Trustees shall keep the Teacher's Report on file for a period of at least two years.

5. The Board of Trustees shall award the Prizes to the Pupils having the highest School Standing for the Term; and in making the awards the Trustees may, in their discretion, take into consideration, but only within the limitations specified in Section 4, the case of any pupil unavoidably absent from School.

6. The Board of Trustees shall determine the nature and value of all Prizes, and shall exercise a responsible care that no Prize be of a character excluded by the provisions of Regulation 33, or by Section 102 of the Schools Act.

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8. The foregoing conditions and regulations are applicable exclusively to Schools, or departments, conducted by Teachers holding valid Licenses under the provisions of Regulation 29 or 30.

By order,

THEODORE H. RAND,
Chief Superintendent Education.

Education Office,
Fredericton, N.B., Aug. 3rd, 1878.

Readings and Recitations.

"MOTHER'S FOOL."

"'Tis plain to me," said a farmer's wife,
"Those boys will make their mark in life;
They never were made to handle a hoe,
And at once to college ought to go.
There's Fred—he's little better'n a fool;
But John and Henry must go to school."

"Well, really, wife," quoth Farmer Brown,
As he set his mug of cider down,
"Fred does more work in a day for me
Than both his brothers do in three.
Book larning will never plant one's corn,
Nor hoe potatoes, sure's you're born,
Nor mend a rod of broken fence—
For my part give me common sense."

But his wife was bound the roost to rule,
And John and Henry were sent to school,
While Fred, of course, was left behind,
For his mother said he had no mind!

Five years at school the students spent,
Then into business each one went.
John learned to play the flute and fiddle,
And parted his hair, of course, in the middle;
While his brother looked rather lugher than he,
And hung out a sign, "H. E. Brown, M.D."

Meanwhile, at home their brother Fred
Had taken a notion into his head;
He quietly trimmed his apple trees,
And weeded his onions, and planted peas;
While, somehow, either by hook or by crook,
He managed to read full many a book;
Until at last his father said
He was getting "book larnin'" into his head.
"But, for all that," said Farmer Brown,
"He's the smartest boy there is in town."

The war broke out, and Captain Fred
Ong hundred men to the battle led;
And when the rebel flag came down,
He came marching home as General Brown,
But he went to work on the farm again
And plowed the ground and sowed the grain,
Re-shingled the barn and mended the fence,
And the people declared "He had common sense."

Now, common sense was very rare,
And the State House needed a portion there;
So the "Family Dunces" moved into town,
And the people called him Governor Brown;
And his brothers, who went to the city school,
Came home to live with "Mother's Fool."

REVIEWS.

AMES' COMPENDIUM OF PRACTICAL AND ORNAMENTAL PENMANSHIP. By Prof. D. T. Ames. New York: A. J. Bicknell & Co.

This work is a complete compendium of pen art, containing over twenty entire alphabets of different kinds, numerous designs for engrossed resolutions, testimonials, certificates, title-pages, monograms, and a great variety of truly artistic pen-flourished designs of every description. The work is the most elegant and elaborate published on the subject, and should be in the hands of every penman and engrosser, as ideas, designs, styles of borders, lettering, flourishing, &c., may be found therein to suit almost any taste. It has to be seen to be properly appreciated. The photo-engraving and printing of the numerous pen pictures are a marvel of excellence.

ELEMENTS OF DESCRIPTIVE GEOMETRY. By J. B. Millar, B.E., C.E., Assistant Lecturer in Engineering in Owens' College, Manchester. Macmillan & Co., London; Willing & Williamson, Toronto. A most admirable work on a subject of great practical importance. The diagrams are good and numerous. It would make an excellent text book for the School of Practical Science now opening, and will be found of much interest and value to engineers and students in engineering.

CATALOGUE OF THE PHAENOGAMOUS AND CRYPTOGRAMOUS PLANTS OF CANADA. Belleville, John Macoun; 85cts. Professor Macoun has enjoyed many advantages for preparing such a work as the above. As Botanist to the Dominion Government he has travelled over nearly the whole of Canada. His Catalogue contains a classified list of 8,081 plants, over 2,900 of which he has personally found in their native wilds. He requests those who are in doubt regarding any species of plant to communicate with him. Addenda will be issued from time to time and sent to the subscribers to the present edition.

MAXWELL'S FIRST LESSONS IN GENERAL GEOGRAPHY. Thomas Laurie, London and Edinburgh. A very elementary work, without maps, and not adapted to the Canadian method of teaching Geography.

TOPICAL COURSE OF STUDY. New York, A. S. Barnes & Co.; 50cts. This work undertakes to lay down for all graded Public and High Schools a uniform course of study. Without expressing any opinion as to the feasibility of the scheme, it is safe to say that teachers and inspectors may receive some suggestions from the book to enable them to make their school work more systematic and orderly.

OUTLINES FOR THE STUDY OF ENGLISH CLASSICS. Boston, Thos. W. Bicknell, 16 Hawley St. The book is "specially designed as a practical manual" for teachers and students. It is not merely a manual of method, however, although this is its chief point of excellence; a point in which it is unsurpassed. It may be used as a book of reference or a text book. The suggestions given are most excellent, the outlines of lessons very practical, and the questions and topics suggested exceedingly useful. A brief sketch of English literature is given, and also a list of the works most useful to the student who wishes a thorough acquaintance with the subject. The book cannot fail to be of great value to teachers, and students who are unable to attend school.

MARITIME SCHOOL READERS. These are, in several respects, good books. The lessons are interesting in the earlier numbers and instructive in all. Dictation, Grammar, and other lessons based on the reading lessons are given. New words are marked for pronunciation, and the meanings given. Questions and notes of lessons are also inserted.

NEW MUSIC. From the titles of songs sent us by Ditson & Co.,

it is easy to believe that the flower season still endures. There is the very pretty "Maiden's Flower Song" by Pinsuti, and "Maiden May" by Gatty, both charming songs. Then there is a comic quartette, "Caw! Caw!" as sung by the Crow family, which would suit admirably for school exhibitions. For the piano, we are favoured with the "Domino Grand Waltz" by Carl Bohm, one of half a dozen fine pieces, "Minnesota March" by Carrie Varney, and a very "Irrepressible Polka" by Johnston.

The *Penman's Art Journal*, published by D. T. Ames, 205 Broadway, New York, is a live, practical Journal, devoted almost exclusively to penmanship. It is profusely illustrated, and handles this much-neglected subject in a masterly manner.

—Lectures begin in the Toronto School of Medicine on Tuesday, October 1st.

—In Parry Sound District the number of pupils registered is 171, with an average attendance of 88.

—A correspondent of the *New England Journal of Education* writes that "the jurors of the Paris Universal Exposition have awarded a diploma of the first class to the Educational Department of Ontario, for the excellence of its system and exhibit of Apparatus and Appliances, while a diploma has been awarded to the Province of Quebec for its exhibit of pupils' work. A diploma has also been awarded to the Ontario Educational Department for excellence of departmental maps; and a diploma has also been granted to the Provincial Government of Ontario in respect of the University of Toronto."

—The following are extracts from the report of Inspector Scarlett, of Northumberland: The total number of children residing in the County, between the ages of 5 and 16, on the 31st December, 1877, 9,753.—Total number of children in the County, between the ages of 5 and 16, entered on the daily school register, 8,938. The percentage of children, between the ages of 5 and 16, entered on the daily registers of the schools is 91, nearly.—The total number of pupils of all ages, entered on the registers of the schools, 9,441. Number of boys, 5,081; of girls, 4,360. Average attendance of all the pupils of the County for the year 1877, 8,091. Percentage of attendance of all ages, 84.

Of the 108 teachers who acted as masters of the Schools of this County during 1877, with the fifteen assistant teachers, there were 2 first class Provincial Certificates, 7 first class old County Board certificates, 24 second class Provincial certificates, 3 old County Board second class certificates, 69 third class certificates, under the new arrangements for the examination of teachers, and 3 permits from the County Board of Examiners.

—The English language is full of paradoxes. "Show me a fire, for I am wet," said a traveller, "and bring me also a jug of ale, for I am dry." "You walk very slow," said a man to a consumptive. "Yes," he replied, "but I am going very fast." Breaking both wings of an army is sure to make it fly. A general may win the day, in a battle fought at night, and a man detained an hour, may be able to make a minute of it. A fire goes out, and yet it does not leave the room; and a man killed in a duel may have a second to live after he is dead. Figures, it is said, will never lie; this is not true of words.—*Barnes' Ed. Monthly.*

Publishers' Department.

We call special attention to the premiums we are offering for subscribers to the JOURNAL.

In another column will be found the advertisement of the "Electric Pen." We have been using one in our office for over three months, and can heartily recommend it to business men who wish to send out circulars, and to teachers who adopt written examinations. Several teachers who are using it for this purpose praise it very highly. A copy is first written in the ordinary way, after which a boy can print therefrom hundreds of copies.

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cannot be procured from booksellers in their own neighbourhood, to the advertisements of retail dealers. We frequently receive remittances from teachers for books, but being strictly wholesale dealers, we sell only to the trade, and in order to save correspondence, mention the fact that any book advertised in these columns, or kept by wholesale dealers, will be sent by these retail advertisers.

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