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THE CANADA  
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PARKER ON TEACHING READING.

BY DR. M'LELLAN, DIRECTOR OF TEACHERS' INSTITUTES FOR ONTARIO.

*To Read and Write comes by Nature.*—DOGBERRY.

MR. PARKER'S article on "Reading" which appeared in the December *Monthly*, was probably intended for the "instruction and reproof" of American teachers. If his description of American methods is a true one, there is pressing need of missionary work, and we do not wonder that his enthusiasm has prompted him to assume the rôle of a *vox clamantis* in the desert of American pedagogy. His alleged facts have little or no relevancy to Canadian methods; but, as his "doctrine" is a curious mixture of exaggerated statement and fallacious inference, it ought not to pass unchallenged among the teachers of the Dominion. The substance of his argument on "Reading" is: NATURE is the true teacher; MAN is the false teacher. Under the fostering care of Nature the child would learn "to talk well, and of course to read well;" but her "inmate man"—with

his wonted perversity—frustrates her beneficence; and instead of accent, pause, emphasis, melody, harmony, in a word all the elements of pure delivery, into which kindly Nature would train the child-voice, we have the whine, and groan, and slovenly articulation, and all the well-known "abominations" of delivery, into which the "devices" of man develop the child-voice. This, if true, is bad, very bad. But is it true? As a teacher, is Nature the all-benevolent, and man the all-malevolent? We have a glimmer of hope that the teacher, Man, is not so black as he is painted, and a sad suspicion that the teacher, Nature, is not so white as she is painted. A brief examination of the utterances of Mr. Parker—the minister and interpreter of "Nature"—will show that, like most oracles, they are ambiguous, not to say self-contradictory. Let us glance at some of them.

1. Nature is the true teacher, therefore "follow nature." In point of brevity, this oracle is admirable; but, in point of meaning—there's the rub. The benign goddess stands ready, it is said, to lead us into all the melody of modulated speech. Yet, she must be somewhat partial in the bestowment of her gifts; she reveals herself only to the favoured few, Mr. Parker being one of the elect; the thronging multitude of earnest teachers are *profani*, to whom she remains invisible, and whose heavy burden she never changes for her lighter yoke. Follow Nature. Yes, by all means. But what and where is Nature? Is she national, or provincial, or local? Is it English nature, or Scottish nature, or Irish nature, or American nature that is to be our guide? Or, again, is it nature in Yorkshire, or in Argyleshire, or in Tipperary, or in Massachusetts that is to fill us with all the music of phrase which should distinguish articulately speaking men? Perhaps Mr. Parker's ideal Nature—his guide to perfect utterance—is that which gives an inimitable drawl (only "Nature" can give it), to the following words:—

Neow is the winta uv eour discontent  
Med glorious summa by this sun o' Yock,  
An' all the cleouds that leowered upon eour  
heouse

In the deep buzzum o' the oshin buried.  
Neow air eour brews beound 'ith victor' us  
wreaths;

Eour bruised arms hung up for monimunc ;  
Eour starn alarms chanj'ed to merry meet-  
ins,

Eour drefle marches to delighfle masures.  
Grim-visaged War heth smeuthed his wrin-  
kled front,

An' neow, instid o' mountin' barebid steeds  
To fright the souls o' ferfle edverseries,  
He capers nimly in a lady's chamber,  
To the lascivious pleasin' uv a loot.

This, this is nature! "What emphasis! What melody! What harmony! Should teaching ruin such voices?" By no means; we shall

not set the teacher so difficult a task; yet, it seems to us that even "deceitful man" may conceive and realize a higher idea of melody in speech than this,

"Straining harsh discords and unpleasing sharps."

2. There is, in fact, endless twaddle about Nature, and what she does and can do for man: Nature, the beneficent builder; man, the mischievous marplot; yet, if she does something for man, she expects him to do a great deal for himself. How great is nature, how insignificant is art! Not so. Each is great in its proper sphere. Art without nature? contemptible indeed. Nature without Art? see her handiwork in savage and in prehistoric man. Nature supplies the crude materials; Art—the product of intelligence and freedom—brings out of them the thing of beauty.

Whatever Nature may have been before the Fall, it is certain that since that catastrophe she needs most careful looking after. It may be true, as one has said, that *then* "man's faculties were quick and expedite; they answered without knocking, they were ready upon the first summons. An Aristotle is but the rubbish of an Adam, and Athens but the ruins of a Paradise." But it is clear that *now*

"Diseased nature oftentimes breaks forth in strange eruptions,"

and hence it needs all that the self-determining power of man can do in the way of physical culture, brain culture and heart culture, to control or counteract the freakish tendencies of diseased nature. It is a mere truism to say that every human faculty can be (and ought to be) improved by culture; and, notwithstanding the dogma of the immortal Dogberry—and the mortal Mr. Parker—that "to read comes by

nature," it is a safe inference that the speaking and singing voice is no exception to the rule.

3. Filled with this Dogberrian creed, Mr. Parker affirms that "That dreadful compound of a whine and a groan, which very many teachers can hear if they listen, is the direct product of a long, painstaking and painful drill." Out of charity towards our American cousins, we can but hope that this is an exaggeration. We have sometimes heard in Canadian schools primary readers pronouncing unfamiliar words in a dreary monotone; but never, in thirty years' experience, have we known of a single teacher fatuously "drilling" in the production of that "dreadful compound." We recognize the "dreadful" sound; we have a dim remembrance of our own primary efforts; but—*pace* Parker—the sound is due to Nature's prompting, not to the teachers' "drill." The teacher is to blame only if he lets Nature have her way—if he fails to correct her "strange eruptions" and to bring out of her crude compound of whine and groan, the sweet cadences of musical expression. We say that the singing tone is "natural" to the child who is wrestling with unfamiliar words. What is the task that is set before him in oral reading, and what his preparation for it? He has learned to talk, they tell us. He has indeed learned *by imitation* to express his few simple ideas, but his vocal organs are as yet but slightly under the control of the will. Besides, in spite of Mr. Parker's contrary opinion, reading is not talking. It is a much more difficult thing to do. Good readers are far rarer than good speakers. Even cultured men who have acquired, of course, the power of rapid word-recognition and a fair control over the organs of speech, find it an exceedingly difficult matter to read aloud any passage with which

they are totally unacquainted. For two distinct mental operations are necessarily involved—that of taking in the thought, and that of giving it out. These two processes are not mutually helpful; on the contrary, they may be said to be inconsistent; part of the mental energy at our disposal is cancelled (if the term may pass) in the subordinate process of taking in the sense, and there is hence less mental power left for the main process of giving out the thought. How great then must be the difficulty for a beginner in reading! For with him, taking in the thought through word-recognition must be the predominant process; while the aim of giving out the thought is but feebly present in his consciousness. What, for him, is this process of taking in the thought? He has to connect (in the alphabet method) the form of a letter with its name, its name with its proper sound, the printed word with the spoken word, the spoken word with the idea, the idea with other ideas similarly acquired. Is it any wonder that these complex operations tax his mental capabilities to the utmost, and leave but little power of attention for the reproduction of the thought so laboriously acquired? He has had very little voice-culture, he has but feeble control over the vocal organs; in pronouncing a hard-won word, he "pitches" his voice in a certain key; "Nature" tells him it is easier to retain that pitch while grappling with the next word; he has acquired no power to "anticipate" the sound of this "next" word while uttering the preceding one; he obeys Nature in economizing his fully taxed powers—in a word, "Nature" suggests singing and he follows "Nature."

4. Still "harping" on the shining Dogberrian principle, Mr. Parker further declares (1) that "if the thought is in the mind, the emphasis

will be perfect;" (2) that "the child has acquired the perfect power of emphasis, pronunciation, enunciation, articulation, accent and pauses;" *i.e.* the full power of educated expression; (3) that "any attempt to teach emphasis by imitation hinders the power to emphasize in oral reading;" (4) that "defective articulation can be cured by following exactly the process by which a child learns to articulate." On these astounding propositions we can remark but briefly: (1) "If the thought is in the mind the emphasis will be perfect." That is, understand a thought and you will be able to express it with perfect delivery. Why? Has the child learned to talk with the best possible expression? If he has so learned, he has learned it by imitating others; his power of elocution has been thus far trained; why stop at the beginning of its development? Again, if the principle is true, how comes it that there are so few good speakers in the world; and good readers fewer still? A child comprehends the thought: "O you hard hearts, you cruel men of Rome, knew ye not Pompey?" But will he deliver it with "the perfect power of emphasis"? Are the numerous bad readers and speakers at the school-desk, in the pulpit, at the bar, illiterate clowns who never grasp the thoughts they so imperfectly express? Dr. Whately instances a clergyman of his acquaintance who read the passage in Matthew: "Is a candle brought to be put under a bushel or under a bed?" as if there was no alternative but bed *or* bushel. Did the clerical reader know the meaning of the passage? Without doubt; yet, like tens of thousands whom he typifies, he had not acquired the power to convey to others the "thought that was in his mind."

(2) "The child has acquired the perfect power of emphasis, etc., etc."

What a precocious child! But from whom did he acquire it? From Nature? Yes, but from educated Nature,—Nature trained by art; from his cultured "environment," or not at all. How did he acquire this blessed power? Why, by Nature's method—by imitation—from his first imperfect articulation, till his last alleged exhibition of "perfect power in melody and harmony" and all the rest of it: there is no other way given under Nature's power. And yet, we are told that

(3) "Any attempt to teach emphasis by imitation, hinders the power of emphasis in oral reading." We hope no teacher will adopt this absurdity as a principle in teaching. The child's first articulation is an attempt to imitate the sounds he hears from his mother or his nurse. By the closest attention to the sounds he hears, by continuous drilling from his natural teachers, by slow and toilsome effort he wins a partial control over the organs of speech, and at last can express his simple thinkings somewhat as his loved instructors do. If he never hears, he will never imitate, if he never imitates, he must remain an *in-fans*—a non-speaking and therefore almost a non-thinking child. Why then should the mode of training which "Nature" suggest for the years of infancy suddenly become unnatural when we begin the more systematic training of the school-room and the college? Is there no continuity in Nature's processes? Without doubt it is possible to attempt too much through imitation; without doubt, too, it is impossible for the child who never hears good models to acquire an excellent delivery. "If the thought is in his mind"—but how are you going to put it there? There is many a noble sentiment that can be communicated to the child with all its educating power only by the voice

of the teacher whose own heart is aglow with its inspiration. For these "cadences of the voice are the commentary of the emotions on the propositions of the intellect." But even if it were possible for the child to obtain through the cold array of printed words the beautiful and lofty thoughts to which the intellect inspired by the emotions may have given birth, it would not be possible, without a suitable cultivation of the organs of speech, to reproduce them in all their force and beauty.

(4) But it appears that "a defect in articulation can be cured by following exactly the same process by which a child learns to articulate." And what process is this? Why, he listens to articulations with close attention, and strives to imitate exactly what he hears. And so a

defect in articulation "is cured in exactly the same way"—*i.e.*, by close observation and persistent imitation of a perfect articulation. What then becomes of the luminous principle that there is to be no teaching by imitation—no model of correct elocution set before the child who is struggling with slovenly articulation, and kindred defects in vocal power? It should be permitted to pass "as the idle winds which we respect not." In learning to read, Nature will do something for us; but the true teacher is not Nature as she is, but Nature improved by an art which is itself penetrated with the spirit of Nature; or, as Shakspeare has it:

There is an art  
Which does mend Nature, change it, rather,  
but  
The art itself is Nature.

## A SCHOOL OF SCIENCE.

BY PROF. W. L. GOODWIN, QUEEN'S COLLEGE AND UNIVERSITY, KINGSTON.

IT is known by all who have given the subject careful consideration, that, other things being equal, the arts and manufactures flourish most vigorously in countries where liberal provision is made for diffusing a knowledge of the principles and applications of science. Many facts might be adduced to illustrate this. English calico printers have come to the conclusion that they are falling behind the United States manufacturers, and this is ascribed to the superior general and technical education of the American artisans. Probably the best instance is that of the sugar industry. Formerly, sugar was almost exclusively manufactured from the sugar-cane, which flourishes only in tropical countries. The process employed was a

comparatively rude and wasteful one. Very little progress was made—improvements suggested themselves very slowly to men who were not brought into competition with the ever-advancing methods of science. Then, the exigencies of European warfare gave rise to the beet-sugar manufacture. Liberal inducements were offered to men of science, and the problem was at least partially solved. But the method at first used for the extraction of sugar from the beet was very imperfect. France and Germany, ever in the front rank in encouraging scientific research, found men who were able to make great improvements in the machinery, and to suggest the adoption of new principles. But, note the unexpected directions in which a know-

ledge of the principles of science leads men to look, when an industry is to be developed. The physicist and the engineer had done their part, and now the chemist and the botanist took up the work, and showed that by using certain fertilisers the percentage of sugar in the beet-root could be largely increased. These improvements in the European sugar industry have forced the West Indians to make similar improvements, and those who have failed to do so have gone to the wall. It is not surprising then to hear, from time to time, of the establishment of botanical gardens in various of these islands; and we can also easily understand the anxiety shown by large employers of labour in the same part of the world to facilitate the founding of schools for the education of the labourers' children. They know that, as a rule, education means advance in intelligence, and that this brings with it increased efficiency in *any* kind of work. The industries of a country advance with the technical education of its inhabitants. Imperfect training means imperfect, wasteful methods of doing things. Good training in any branch of industry includes the acquisition of the principles which underlie the art. In order that progress may be made, it is not sufficient to know only the methods at present employed; it is also necessary to know where improvements are needed, where they are possible, and the best way to attempt them. We do not need to go far afield to find instances of disastrous failures in manufacturing enterprises, due to reliance on empirical knowledge.

It is a fact of every-day experience that the method of carrying on any manufacture or other industry must be varied to suit a great many varying circumstances. Mere experience of what has been done will not enable

a man to grapple with these pioneer problems. He must get down to principles. If a man has that commanding native genius which enables him to grasp principles and applications at a glance, he may succeed in surmounting every obstacle to an enterprise; but these men are rare, and the community's prosperity depends on the average man. If the average man depends on knowledge gained from a necessarily limited experience, he is not as likely to be successful as one who has added to experimental knowledge an acquaintance with the laws and those generalizations called laws, which underlie and connect all phenomena. For example, a copper mine is discovered. The ore is very rich, and contains silver as well as copper. An attempt is made to work the ore by a process which has given excellent results with other ores. Expensive plant is set up, but the results are found to be unsatisfactory. This is a *new* ore. There are substances in it which make the old process inapplicable. The average empirical man is floored. He can do nothing without the advice of a scientific metallurgist. The thing is *new*, and requires a reference to the general principles of chemistry and metallurgy. At the Montreal meeting of the British Association for the Advancement of Science, a very noticeable feature in some of the departments was the prominence of great manufacturers as readers of papers and sharers in the discussions of scientific questions. These men dealt with both practical and theoretical questions in a way which convinced the hearer that they were thoroughly at home in both domains. When one listened to such men, and knew who they were, one could better understand the position which England holds as first in metallurgical and in many chemical industries. In the latter, however,

Germany is perhaps in advance. Her technical schools are numerous and efficient, and the names of Siemens and Hofmann attest to her influence in English industrial arts.

Canada, with her vast agricultural, mineral, and other resources, surely needs to make more adequate provision for technical education than is now available. The wealth of a country can only be increased in one way, and that is by increasing the rate of production. This can be done by increasing the number of productive labourers, and especially by increasing their efficiency. Wealth must be raised from soil, rock, and sea; or it must come from the laborious hands of the skilled artificer. It is useless to look to any policy of government for material prosperity, until we have attended to this point, viz.: to see to it that the *producers* are as efficient as possible. To this end, we require technical schools. We have one in Toronto, and now we ask for one in Kingston, for the eastern part of the Province, to train our young men for their maintenance. Here is great mineral wealth. Here is room for the planting of manufactures which shall meet the wants of our increasing population. In a word, there is good reason for the prayer of the city and county councils of Eastern Ontario, as embodied in the resolutions, of which the following serves as a type:

"Moved by Ald. Gildersleeve, seconded by Ald. McIntyre:

"Whereas the Government of the Province of Ontario has set apart a valuable site in the Queen's Park, Toronto, for Victoria College, and proposes to establish also at the public cost, a new university professoriate, or to greatly extend the School of Science in Toronto; and whereas, in the above and other ways, private and denominational effort, in the work of higher education, is acknowledged,

and, by the combination of public and private liberality, to further a desirable common end, voluntary contributions for colleges situated in Toronto are stimulated; and whereas it is only just that this policy should be extended to Eastern Ontario, in whose centre a fully equipped university has been established through the liberality of the people, continued for nearly fifty years; and whereas any legislative measure dealing with university education should be a comprehensive one: and whereas it would be injurious to the best interests of the Province if all the means of obtaining a practical scientific education were centralized in Toronto, as well as opposed to the spirit of our institutions, and particularly of our educational system; and whereas this section of the Province requires for the development of its mining, manufacturing, mechanical, agricultural, shipping, chemical and other interests, the establishment of a school of practical science; and whereas such schools can be carried on most efficiently and most economically in a university city, because instruction can be obtained in such fundamental subjects as mathematics, astronomy, physics, chemistry, natural history, without direct cost to the Government, and at a great saving of time and expense to the young men who desire to obtain that thorough scientific training by which the country as a whole is benefited, as may be seen by the comparatively small cost of the Toronto School of Science in the past because of its contiguity to University College:

"Therefore, be it resolved, (1) that this council respectfully memorialize the Government of the Province of Ontario to take steps to establish in Kingston, in connection with and as part of its educational policy, an institution in which instruction shall be given in mining and metallurgy;



analytical and applied chemistry, engineering and generally on the applications of science to the mechanic arts, agriculture, navigation and other industries of the people; (2) that the council appoint his Worship the Mayor, Aids. Gildersleeve and McIntyre a deputation to wait upon the Government to press the above on its immediate consideration; (3) that this council, being convinced that a

school of practical science would be of incalculable value in stimulating all the industries of Eastern Ontario, and more particularly of value to the intelligent young men of this section of the Province, respectfully invites the adjacent municipalities and county councils to unite with it in such ways as may seem best to them respectively in pressing the matter on the Government."

## OBSERVATIONS REGARDING THE TEACHING OF SCIENCE IN OUR HIGH SCHOOLS.

BY D. F. H. WILKINS, B.A., BAC. APP. SCI.

TO-DAY, in the hurry and bustle of modern life, with every ignoramus presenting his would-be thought-infallible panacea for the sins and sorrows of poor suffering humanity, with only too many throwing away those sheet anchors which have stood the test of time, it is surely hardly unbecoming in a humble teacher to express an opinion, based on the results of his own observations as an educator, bearing in mind, on the other hand, that it is hardly *en regle* for a subaltern to comment upon much, less to criticise, the orders of his colonel, of his major, or even of his captain.

Let me then, discarding the third person, speak plainly *re* Science Teaching in our Collegiate Institutes and High Schools; and in so doing, let me say that there are certain uncharitable people who are continually decrying our system as one of mere empiricism—a little baking here, a little chipping there, a little paring down in this place, a little plastering on in that; piling up and pulling down, altering standards, regulations, etc., in such an astonishing way that educational leaders at each term's

beginning involuntarily ask themselves, "What next?"

Elsewhere (in my Essay, "Some Spring Flowers") I have pleaded for botany as a means for training at least some of the mental powers, and concerning the educational value of physics I hold equally decided opinions. That is to say, the leading facts of physics may be so presented to the mind as both to communicate knowledge and to develop the entire mind-nature, the character. Here by an appeal to common, every-day phenomena, there by simple and cheap experiments, here by Socratic questioning, there by direct dogmatic teaching, all other means being out of our power, or by a combination of these, we have in physics a most valuable educational agent. There remains therefore, so far as our High School course is concerned, chemistry as a subject, to be considered.

And here, first of all, no matter what may be said to the contrary, costly apparatus is necessary. It is useless to tell the teacher that with a little ingenuity he can prepare what is necessary. Home-made appliances can never be so reliable and so useful

as those prepared by special instrument-makers; for the successful performance of experiments, "Cheap Jack" substitutes are poor apologies indeed. Again, all teachers are not born mechanics; many a very useful and successful teacher is utterly unable to jump from his school to a tinsmith's or a carpenter's bench, or a blacksmith's forge, and hope to equal if not to rival, the efforts of skilled workmen. Even were such possible, it is hardly fair to expect spare time to be devoted to instrument-making, when so many other claims imperatively demand the teacher's attention. Remembering that what is worth doing at all is worth doing well, it is not too much to ask that at least six hundred dollars be devoted to the purchase of apparatus and of chemicals, and at least forty to fifty dollars per annum be devoted to paying for chemicals used during the year, breakages, etc. Large as this sum may seem, it is little enough for him who would teach chemistry with satisfactory results; especially if we remember that every student must, as far as possible, verify each experiment for himself,

Again, time is pre-eminently a necessary consideration in the teaching of chemistry. In the preparation of botanical specimens for classes, a few minutes will suffice; even for teaching physics, a short time will in general be enough for arrangement; but in chemistry, even the veriest tyro knows with how much trouble and time experiments are prepared; every one knows how many chances of failure there are to one of success; how unless every experiment be properly and carefully rehearsed, failure is almost certain. Yet in Ontario High Schools of two or of three masters, the science teacher has at least half a dozen other subjects assigned to him. He is expected to jump from class to class, leaving only too often his ap-

paratus unwashed and still set up; perhaps to be taken apart, cleaned and put away by some student, whose time can be ill spared for the purpose; more often to be left to be dealt with by the master himself at a more convenient season, whenever this may come. And he is expected to give full time to each subject, and yet to secure his full amount for rehearsal of experiments, for class-work in chemistry, and for subsequent cleaning up and putting neatly away the apparatus used.

But even allowing these difficulties to be removed, and everything to be so well arranged that each pupil may experiment for himself under the master's eye, as the High School regulations prescribe, even then all is not perfect; for proficiency on the part of the teacher by no means infers like proficiency on the part of the pupil. It may be the proud boast of the master that *he* never failed in any experiment; it certainly cannot be the boast of the pupil, especially if we consider the ever-varying conditions of age, sex, rank of life, disposition, represented by students in general. The pupil requires time and experience to learn chemical manipulation, but amidst the rustle, bustle, hurry and worry of school-life, where shall this time be found?

The pupil too, if successful, may rest on the results of experiments, without going on from experiment to principle; only too often if these experiments have been brilliant and showy. Only too often the brilliant revelations of experiment are realized merely as so many *aides-memoire* to that awful demon, "the examination." Never a word, never a thought, is given to the underlying law; never a word, never a thought, goes out to the Universe of God. And this, not because the teacher is unwilling or incapable, but because the pupil will not follow. Only too often does the unfortunate

teacher find himself in the position of Marshal Beresford on the gloomy, gory field of Albuera, when he, after having dragged *vi et armis* a Spanish ensign to the front, in the hope that some few of the thirty thousand Spanish troops would follow and relieve the pressure on the British, saw with disgust that not only none attempted to follow, but that the ensign released trotted back leisurely with his country's flag to his country's soldiers. If my own experience, as a science teacher of over ten years' experience be deemed of any value, I must say that it has shown me clearly that the tendency to rest on experiment, and to go no further, is far too common, although vigorously combated by the teacher.

Again, the pupil, even if he do thus push on in the path from experiment to principle, acquires the vicious habit of basing a broad sweeping generalization on the result of one or two successfully conducted trials. An American humourist has aptly said that there is no more profitable investment than modern experimental science; "because," he says, "one can get whole tons of conjecture by the investment of one grain of fact." Be this statement true or false, the vile habit of inferring a general, even an all-embracing law or principle, from the results of one hastily performed experiment, certainly does not tend to disprove the statement, and the habit is one only too commonly formed. It is entirely out of the question to expect the pupil to

perform an elaborately detailed set of costly experiments, in order to verify a "law of Nature"; and yet, in order that the student may acquire the correct "scientific method" of reasoning, nothing else ought to be done. In other words, the ability to correctly infer the general proposition from a single nastily-performed experiment belongs not to the unfledged tyro, but to the finished experienced *savant*. To expect aught else than crude guesses, hasty generalizations, imperfect abstractions, confusion of analogy with induction, etc., is to put an altogether too sweetly serene a faith in the embryonic student nature, besides losing the value of chemistry as a "mind-trainer." If the untrained student can perform these wonderful feats, and realize law after law by an experiment or two, how will chemistry train and develop that which has already gone so far?

In conclusion, let me say that my own experience as an educator leads me to conclude that chemistry as a mind-trainer is for the above-given reasons—costliness of apparatus, want of time, risks of failure, and above all, risks of developing vicious mental habits, in spite of the vigilance of the teacher—far inferior to botany or physics; and that the Collegiate Institutes and High Schools of Ontario would be benefited rather than injured, were it relegated to the first year of the courses of our Standard Universities, as a subject to be pursued by minds already to some extent trained and disciplined.

"That school or that system of schools," says D. C. Tillotson, Superintendent of Schools, Topeka, Kansas, "which succeeds in preparing ordinary children to be ordinary men and women, and fits them for the ordinary duties of life, is a remarkably successful school. Geniuses are not produced by the schools. The universities could not produce a Shakespeare. Because he was so poor in English composition, Harvard College questioned the

propriety of granting a diploma to the man who is to-day the greatest American in the field of letters. Men of talent have ever done more for the schools than the schools have done for them. It is my opinion that that man is of greatest value to any community who urges and assists the schools to quietly persevere in fitting the average mortal for the commonplace duties of everyday life."

## POWER TO READ.

IF we mean by these words power to utter the vocal sounds corresponding to a series of printed or written symbols at sight of the symbols, our teaching of reading must be considered fairly successful. If we include also the power to give appropriate expression to narrative and descriptive passages, the same may be said. But even with these admissions there is room for the question, "Are we successful in giving the power to read?" Such an occurrence as this may give rise to the question: An intelligent man wishes to put together a simple machine from a printed description which he holds in his hands. He reads the description twice carefully, and then addresses himself to his task. But the parts will not go together. He resumes the paper, determined to follow the directions in detail, one by one. Still he finds trouble—a perversity in animate things. "Is it true that I cannot read that paper," he exclaims, "or is there something wrong with these parts?" At length they slip into place in a way as unaccountable as their former obstinacy. He reads the paper, and examines the result. "Why!" he remarks, "that is just what the paper tells me to do! what a fool I was!" How ought he to answer the question as to his ability to read?

A distinguished professor of science remarked the other day: "The great trouble with college boys is that they do not know how to read. If they could only be taught to read before they come to me, I could do a great deal more for them, but they don't know how when they come to me, and they don't know how, some of them, when they leave me; for I have not time enough to teach them.

I give a boy a book containing detailed directions how to perform an experiment, and send him into the laboratory with it to work. If he simply follows the directions, he cannot go amiss. After a little time I go around to see how he is getting on, and find that he has made a mess of it. The boy don't know how to read." Is the charge justifiable? We may go further, and ask whether these cases are exceptional? As a matter of fact, do they represent the usual result of our teaching?

Assuming that they do, it is not difficult to designate the nature of the failure. Reading consists in translating symbols appealing to the eye into corresponding sound symbols, which again ought to call up definite ideas. In the cases cited these symbols are the names of material things and of their relations. If the whole process is complete, the imagination will picture these parts and their relations, and the picture will be accurate in details, because a rightly trained mind will not rest until every symbol has its corresponding definite image. Thus working constructively, the imagination ought to build as the reader progresses, so that at the conclusion of the reading he should say, "I see it." This requires considerable imaginative power. The details are not only to be clearly grasped or imaged, but held and combined, so as to be seen in their relations. It is manifest that in these cases there is a complete break-down in the effort to do this. The imagination has not been skilfully trained. It is not strong enough. It does not respond to the verbal symbols, and the process breaks down in its last and most vital stage.

But this is not the whole of the

difficulty. In these cases the persons abandon the effort to see the thing as a whole, and resort to the objects to help them out. They have only to do one thing at a time precisely as they are directed; and they fail in this. It is evident that they do not take in the details distinctly. The language is definite, but their ideas are vague and confused. They are capable of uttering to themselves words which say do one thing and in response of doing quite another thing. They are somewhat in the condition of Sir Hudibras:

“His notions fitted things so well  
That which was which he could not tell.”

Thus we arrive at the fundamental difficulty, and find it to be essentially what Rousseau points out in his tirade against books: “*The abuse of reading is destruction of knowledge.* Imagining ourselves to know everything we read, we conceive it unnecessary to learn it by other means. Too much reading, however, serves only to make us presumptuous block-heads.” This will at once suggest that the loose habits of which we are complaining are the results of general reading and reading for amusement, in which the reader is content to take what he gets easily and without effort, and to let other words float through his mind without caring whether they suggest definite ideas or not. Enough is seized to keep up interest, and the matter is not worth laborious attention to details. In this way one learns to read rapidly, and in a way increases his knowledge and his vocabulary. Now, the school exercises in the higher grades ought to supplement this loose and haphazard learning, by furnishing the kind of training which this cannot give. One of their chief ends should be to form critical habits, to make every word significant, to call into full play the imagination and the

understanding. We are not now thinking of that distinctively literary training upon which Mr. Matthew Arnold sets so great store; that appreciation of the artistic element in literature, which purifies the taste and refines the nature. This, too, is important to develop in the advanced reading class. But the more elementary work is the more indispensable, and this consists in teaching pupils to get out of books what is in them. When they have learned that, books will be to them, as they ought to be, interpreters of things. They will at least have the power—and they ought to have the habit also—of interpreting exactly what they read, not missing any part of it and not misinterpreting any part. Almost any school-room will furnish to an observant teacher evidence how difficult a task and how rare an attainment this is. Much of the trouble which pupils experience in stating problems in algebra or arithmetic arises out of their inability to read, and a good book of problems is therefore an excellent instrument for developing this power. The shortcomings and errors of recitations are often attributed to the defect of memory or weakness of understanding, when, in fact, they are due to the pupil's inability to read: and it would be a great service if teachers would point this out, and thus not merely correct the special error, but the mental habit which caused them. Put pupils to drawing definite forms from written or printed descriptions, and observe what effort it costs them to translate the sentences which they read into visible forms. Or let them read such a description as carefully as they wish, and then from memory direct others how to draw the figures. Clearly, then, we need more training in reading critically, reading whose aim shall be to get exactly what is said, and to get every detail of it

exactly. We are falsely assuming that because people read easily, and use the words they meet, therefore they know not what these words mean. When they read words

accurately descriptive of things, and then bring their notions to the test of the things, how often do we find them indefinite or erroneous!—*Intelligence.*

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## NOTES FOR TEACHERS.

IT is stated that a majority of the teachers in Berlin, Germany, are unfavourably disposed toward the Kindergarten. They agree that the children's minds are developed, they have facility of expression, power to calculate and to remember, and that they obtain a rapid conception of things. They complain that they lack perseverance because easily wearied, and are more inclined to play than to work.

THE *Mail*, in the political platform which it submits to the country in view of the approaching provincial elections, advocates "reform of the Education Department; abolition of the political headship; return to government by a permanent General Superintendent wholly unconnected with machine politics; abolition of the Nelson and other publishing monopolies; and free competition in school books." We of Quebec ought surely to feel thankful that the discussion of educational affairs is kept in such great measure free from the arena of party politics. Notwithstanding the faith which outsiders have in the excellence of the Ontario system of schools, the people of that Province themselves seem at times to lose all faith in it. Let us hope that the faith will return to them after the election is over.—*Educational Record.*

A MEMBER of the Stratford Collegiate Institute Board recently addressed a circular to parents, asking

their views on the efficiency of the teaching staff, and soliciting suggestions as to any changes that would in their opinion seem desirable. A list of suggestive questions was appended for the parent to answer. Such intermeddling is very much akin to the action lately taken by a deputation who waited upon a teacher of twenty years' standing in the Province of Quebec, asking him re-organize his school in behalf of their boys. If teachers are satisfied to be a kind of upper servant, taking the kicks with the half pence they receive as fees, such intermeddling with old and tried teachers will not readily cease. To a respectful suggestion on the part of a parent, no discreet teacher will object, but when one or two officious parents combine to terrorize the teacher, it is time to dismiss such officiousness with the silent contempt it so richly deserves. But for this terrorism in Ontario, there would be fewer changes in the head-masterships and other educational positions, and the less of it we countenance in this Province the better for all concerned.

COLONIZATION IN SOUTH AMERICA.—There has been during the last fifteen years since 1870, an increasingly large emigration from European countries into South America. It is true that Germans in large numbers (chiefly of the peasant farmer class) prefer the northern half of the continent, but one hundred and twenty thousand Germans, increasing at the rate of two

thousand annually, have found a home in South America. Three quarters of a million of Italians, increasing at the rate of thirty or forty thousand annually, are to be found settled in large communities in the different States of South America, and there are also now settled there four hundred thousand Spaniards, and eighty thousand Frenchmen. The natives of the country are Hispano Indians, being hot blooded and very patriotic. Spanish is the official language, and by law is taught in all the schools—even in those established by the new comers. The German emigrants are in close relation to the Fatherland, and some attempt has been made to direct and control the outgoing stream with the view of establishing German States in that southern land—not very successfully, however, although there has been a good deal of boasting on the subject. The Italian government, while not seeking either to control or direct, has, with true foresight, voted every year a sum not less than £50,000 in aid of the schools and institutions of learning established by the new settlers, thus, as the colonies expand and grow, this evidence of interest forms a strong bond between them and the mother country. The climate of South America appears to suit the Italian emigrant uncommonly well.

A GIRL'S READING.—We all know Charles Lamb's views on the subject of early reading, as expressed in his triumphant vindication of Bridget Elia's neglected education:—

"She was tumbled by accident or design into a spacious closet of good old English books, without much selection or prohibition, and browsed at will upon that fair and wholesome pasturage. Had I twenty girls, they should be brought up exactly in this fashion."

It is natural that but few parents are anxious to risk so hazardous an

experiment, especially as the training of "incomparable old maids," is hardly the recognized summit of maternal ambition; but Bridget Elia at least ran no danger of intellectual starvation, while, if we pursue a modern school-girl along the track of her self-chosen reading, we shall be astonished that so much printed matter can yield so little mental nourishment. She has begun, no doubt, with childish stories, bright and well written, probably, but following each other in such quick succession that none of them have left any distinct impression on her mind. Books that children read but once are of scant service to them; those that have really helped to warm our imaginations and to train our faculties are the few old friends we know so well that they have become a portion of our thinking selves. At ten or twelve the little girl aspires to something partly grown-up—to those nondescript tales which, trembling ever on the brink of sentiment, seem afraid to risk the plunge; and with her appetite whetted by a course of this unsatisfying diet, she is soon ripe for a little more excitement and a great deal more love, so graduates into Rhoda Broughton and the "Duchess," at which point her intellectual career is closed. She has no idea, even, of what she has missed in the world of books. She tells you that she "don't care for Dickens," and "can't get interested in Scott," with a placidity that plainly shows she lays the blame for this state of affairs on the great masters who have amused and charmed the world. As for Northanger Abbey, or Emma, she would as soon think of finding entertainment in Henry Esmond. She has probably never read a single masterpiece of our language; she has never been moved by a noble poem, or stirred to the quick by a well-told page of history; she has never opened the pores of her mind for the recep-

tion of a vigorous thought, or the solution of a mental problem; yet she may be found daily in the circulating library, and is seldom visible on the street without a book or two under her arm.—*Agnes Repplier, in the Atlantic.*

WHAT EVERY GIRL OUGHT TO LEARN.—We have only space to particularize what every girl ought especially to know before she leaves the home and the school. It is due to others to say that we have gleaned from all the sources within our reach in order to make this enumeration as complete as possible.

She should learn to use her senses to the best advantage, especially her hands and eyes; in other words, she should have an "education by doing."

She should learn how to wear a calico dress, and to wear it like a queen.

She should learn who to sew, darn, and mend.

She should learn to cultivate flowers and to keep the kitchen garden.

She should learn to make the neatest room in the house.

She should learn to have nothing to do with intemperate or dissolute young men.

She should learn that tight lacing is uncomely as well as injurious to health.

She should learn to regard the morals and habits, and not money, in selecting her associates.

She should learn that 100 cents make a dollar.

She should learn how to arrange the parlour and library.

She should learn that there is nothing more conducive to happiness than a comfortable house dress. The idea that anything is good enough about the house and in the kitchen is a very grave mistake.

She should learn to observe the old rule: "A place for everything, and everything in its place."

She should learn that music, drawing, and painting are real accomplishments in the home, and are not to be neglected if there be time and money for their use.

She should learn the important truism: "That the more she lives within her income the more she will save, and the farther she will get away from the poorhouse."

She should learn that a good, steady, church-going mechanic, farmer, clerk, or teacher, without a cent, is worth more than forty loafers or non-producers in broadcloth.

She should learn to embrace every opportunity for reading, and to select such books as will give her the most useful and practical information in order to make the best progress in earlier as well as later home and school life.

She should learn that a plain, short dress, comfortably made, is a very regiment of strength; and wash goods are decidedly preferable, because, with a clean dress, even if it be only a cheap print or homespun, a woman puts on a kind of beauty, and there is something in clean clothes marvellously helpful to being clean-tempered.

She should learn how to manage a house. Whether she marry or whether she do not, the knowledge will almost certainly be of service, and at some time of her life will probably be a necessity to her.

"A girl, whether rich or poor, whose education has been conducted upon a plane so high that to become a fashionable idler or an inconsequent gossip or dawdler would be impossible, is the one who will be most earnest in considering the holy purposes, in fitting herself for the responsibilities, of the most serious step of her life—marriage."—*American Exchange.*

ELEMENTS OF PEDAGOGY.—Education, as an art, is based on the nature



of the beings educated; and the methods employed depend upon our knowledge of the educable nature. How is this knowledge to be obtained? A clear knowledge of the activities of the soul is needed by the teacher. Some knowledge of the facts of which Psychology treats is necessary to its study. Technical terms are necessary, and such as are sanctioned by best usage should be employed. A clear Psychological understanding of child nature is necessarily based, to some extent, on a knowledge of Physiology. The knowledge of relative activity and development of the several intellectual powers in the successive periods of child life determine the principles and methods of teaching. We should not be misled by taking maxims, which have only a limited application, for universal principles of teaching. Under the influence of over-teaching, the pupils reach the high school without the power of self-effort and study. The highest success in teaching is only attained by the teacher's making the methods he uses *his own*. Formal religious introduction is not needed so much in school as the quickening of the conscience by a wise use of religious motives. Psychology is the science of the human soul. The power of the soul to feel is *sensibility*; its power to know is the *intellect*; its power to will is the will. The human soul is a unity in essence, with a trinity of powers and activities, distinct but not independent. The nervous system is the organ of feeling, both corporal and physical. 1. Corporal feelings include sensations, appetites and instincts. 2. Physical feelings include the emotions, the affections and the desires. 3. The soul, in the exercise of its will powers, is largely the controller of the feelings as well as the director of its intellectual activities. The physical feelings may all be cultivated by appropriate exercise. 4.

The phenomena of the sensibility show a close connection of the soul and the body. The feelings affect the vital functions of the body, and in turn are affected by bodily conditions.

The intellect is the knowing power of the soul. The product of an act of knowing is knowledge. 1. The soul is endowed with the power to know directly, and immediately presents objects of knowledge. This is called the *presentative power*. 2. The power of the soul to know its own acts and states, and itself as the knower, is called *consciousness*. Consciousness is an immediate perception of the physical act or state known. The soul is not equally conscious of all its acts and states. The distinctness of consciousness may be increased by directing the mind to the act. The exercise of this power of self-direction is called *attention*. The power of attention is controlled by the will. 3. Sense-perception is the power of the soul that knows directly material objects. Sense-perception involves three co-existent physical elements, viz.: sensation, a feeling; the perceiving of the sensation, an act of consciousness; and the perception of the material object. Sense-perception may be classified as *original* and *acquired*. In perception, the senses may be directed, energized and made acute by attention. The mind distinctively perceives only those objects to which it gives some degree of attention. The powers of attention may be excited by putting an object in an attractive manner. The exercise of attention taxes and rapidly exhausts the nervous energy.—*E. E. White.*

THE Greeks used the letters of the alphabet for numerals. The cumbersome system used by the Romans, and called after them, consisted of strokes (I-II-III-III) to indicate the

four fingers, and two strokes joined (V) to represent the hand, or five fingers. Ten was a picture of two hands, or two V's (X). But when the Romans and Greeks worked at the higher mathematics or attempted hard sums in arithmetic, they are much more likely to have used letters, in order to avoid the clumsiness of these numerals; in other words, they used what looked like a kind of algebra. We know that they tried to simplify the Roman numerals at Rome by making four and nine with three strokes instead of four, by placing an I before the V and an I before the X (IV. and IX).

Our use of the numerals which we call "Arabic" is comparatively recent, and it is believed that the Arabs got these numbers from India several centuries after the Koran was written, or about 800 years after Christ. Whether the Indian numerals were originally part of some ancient alpha-

bet, or a series of shortened signs originally somewhat like the Roman numerals that we still use, is not really decided.

The numbers used by the peoples of India who wrote in Sanskrit were very like the figures 1, 2, 3, 4, 5, 6, 7, 8, 9, and 0, that we use to-day. Even closer resemblances will be found if one goes back to the earliest forms of our numerals; for, during the last thousand years, our numbers have undergone some slight changes. Together with these numerals, the Arabs learned from India how to do sums by algebra. For algebra, though an Arabic word, is a science of which the Arabs were ignorant before they reached India.

It may be said that the invention of these numerals and of algebra for the higher mathematics stamps the old Hindoos as one of the most wonderful races of the world.—*St. Nicholas for September.*

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## A NEGLECTED WORK IN THE EDUCATIONAL SYSTEM OF ONTARIO.

BY W. H. HUSTON, M.A., HON. SECRETARY OF THE TORONTO INDUSTRIAL SCHOOL ASSOCIATION.

WE hear so much with regard to the excellence of our Ontario educational system, that we have begun to think it perfect, or at any rate so nearly perfect that we need not concern ourselves in examining it carefully in its scope and work, or in estimating how it affects social conditions, and in turn is affected by them. Such a feeling of satisfaction and such indifference are always disastrous in connection with any of our institutions; but when the apathy concerns a matter so important as education, and especially when it is seen that this feeling of indifference

affects not only the general public, but also the teaching profession, which is so intimately connected with the shaping of our educational system, it is surely matter for something even stronger than regret.

It is not to be forgotten that "Experience is the best school-mistress," is true as well of educational as of other theories, plans and systems; and that like other teachers, she takes special pleasure in instructing the willing mind always on the alert for information. Reforms come slowly—even when urgently needed—because we fail to examine, to compare,

and to come to conclusions. It is easy nowadays to point out to our pupils the glaring mistake made by English law-makers in the framing of regulations affecting the poor, the coinage, or commerce; it is just as easy to make as serious a mistake in imagining that we have seen the end from the beginning in drafting our own statutes. That, however, our view is limited we acknowledge every time we repeal or amend an Act of Parliament, and the very existence of such courts as the Court of Equity, instituted to remove any injustice arising from the administration of the strict letter of laws supposed to be just, ought to remind us of our proneness to err. Our educational system is still young, and time will doubtless point out not merely minor but also serious mistakes, perhaps in connection with foundation principles that we regard as imperishably true. In fact there are some that fancy they see serious complications and dangers about to arise in society, not in spite of our system of education, but because of it. It would be interesting to discuss some of these supposed dangers, but it is purposed to point out only one of the defects of our school system, and that a sin of omission and not of commission; in other words, not to find fault with what we have, but to indicate what we have not.

We never tire of stating that in Ontario the schools are free to all, without exception or distinction. In fact this is our chief boast, the feature that, in our opinion, distinguishes our system from those of older countries. But it is in this very respect that our system lacks, for it is not free to all. There is a large—and apparently a growing—class of boys and girls that are unable to attend school, or, at any rate, that do not attend. Though no fees are required of pupils, our schools can never be

called free till every boy and girl in the land is able to attend. The possession of money is, of course, not now necessary, but decent clothes are. Many a poor child, knowing that going to school means loss of meals and lack of clothing, will tell you that to him, at least, our schools are not free. For such children, our system makes no adequate provision, and it is only recently that any at all has been made.

That a class of boys and girls—considerable in size, if not large, and certainly of much importance—is practically deprived of the right to attend school is evident from facts recorded in the registers of our Police Courts; that provision should be made at once for them is plain from considerations of policy and justice, not to mention benevolence. In the year 1885 there were arraigned before the police magistrate of Toronto, 828 boys, and 74 girls, under 16 years of age, and the numbers for 1886 were 550 and 29.\* Add to these those that succeeded in keeping out of the hands of the police, and you have an element, the management and control of which will entail enormous expense and anxiety on the part of the public. Nor is it in the cities alone that such a class is found. In all our towns these children are to be seen on the streets picking up what living they can, or refusing to be held in discipline by irresolute or perhaps vicious parents. Even in our villages many of this class may be found, not perhaps suffering to the same extent from hunger and exposure, but growing up to be even more of a terror to the vicinity because of its lack of effective police protection.

Speaking roughly, this class may be divided into three classes. (1) Those without parents or relatives. (2)

\*The decrease in 1886 is to be attributed to the special efforts instituted in that year to enforce the laws respecting attendance of boys in bar-rooms, billiard parlours, etc. The number is still, however, strikingly large.

Those whose relatives cannot or will not support them. (3) Those who have got beyond the discipline of their relatives. The first class certainly should be looked after by the State. For children left helpless must surely deserve from the State, what they cannot give themselves, a training that will enable them to live honestly. It makes little difference whether they are vicious or not; they must be taken in hand, and given a chance. Those of the second class also should receive attention, for whether a boy's parents are alive or not makes little difference to him if he is thrown upon his own resources. The third class should be dealt with by the State, though, perhaps, in a different way, and for a different reason. Not to speak of justice, there is that chief function and duty of a commonwealth, namely, to protect the weak against the strong, that demands first, that children should be removed from surroundings that in any way encourage a life of crime, and second, that when they have unfortunately been involved in such a career, and have become incorrigible—and therefore an influence for bad—they should be removed to a safe spot where they cannot contaminate others.

With this as with other classes already criminal, or placed in circumstances that will lead them to become criminal, there are only two proper courses: First, if possible, to secure the unfortunate before bad habits have been formed, and evil associations have tied him to a life of vice, remove him, and place him in the midst of good influences, to educate him to hate crime, at the same time teaching him some useful trade that will give him the opportunity of winning an honest livelihood. Second, if he is a hardened criminal, to remove him to a place where he will have no influence over either the innocent or those whose habits are not such as to cor-

bid all hope of reform. The first of these processes is educational in the best sense of the word; the second is chiefly penal, but might be made, to some extent, reformatory or educational.

Were such a course of treatment followed what would result? First, the stream of evil tendency would be cut off at its source, and useful citizens would be made of those who otherwise would have been criminals all their life, and would have been the occasion of loss and expense to the State. Second, the criminal—especially if he were sentenced for no definite period—would endeavour to show himself tractable in order to procure his dismissal on the ground of good conduct, and when once he was set at liberty he would hesitate to commit the smallest crime, knowing that it might result in perpetual imprisonment. Such a plan would probably not be more difficult in its working than that now in vogue, which has these two faults, that it does not educate—at least not in the right way—and that its only object is to punish in order to deter. In other words, instead of stepping in and anticipating crime, we allow neglected children to commit it and then place them in contact with hardened criminals, who serve as schoolmasters in crime. Thus we send the culprit out after his thirty days or three months in a far worse state than that in which he entered, only to have him back in a very short time for a longer term and for a more serious offence.

Of these plans who can hesitate to make choice? And yet things will go on much the same way unless public attention is directed to this question. For years and years the matter has been agitated by Prison Reform Associations and by philanthropic men, and something has been accomplished, but not much. When teachers discuss the question at their gatherings,

and petition and memorialize the Minister of Education as they do with reference to an unsatisfactory Algebra paper, public feeling will be aroused, and governments will be compelled to recognize their duties in the organization and maintenance of reformatory institutions.

In England and Scotland a beginning—and a good one—has already been made. In 1883 there were in these countries 63 Reformatory Schools, 133 certified Industrial Schools, and 11 Day Industrial Schools, maintained at an annual expense of \$2,250,000, of which the Government pays half. In the United States too there is a growing interest in this department of education, and a number of schools has been organized. In Canada there is at present no such school in operation with the exception of the Reformatory—which is practically penal rather than educational—and the various Infants' and Boys' Homes, which are of necessity compelled to discharge their little ones at a very early age, and are almost entirely voluntarily supported. It will not, however, be long before at least one institution devoted entirely to reclaiming this class will be in operation. At Mimico substantial buildings have been erected and are now ready for occupation, and it is expected that in the course of a few weeks the school will be actively engaged in performing its work under the name of the Victoria Industrial School. The aim of the institution will be inferred from what has been already stated, but that its plan may be better understood the following excerpts from a pamphlet issued by the Board of the new school are inserted :

“It is intended to fill a place which the Juvenile Reformatory does not altogether fill, being more in the nature of a ‘Preventive Home,’ into which homeless lads can be taken off the

street, and surrounded with good influences and taught to earn their living at some trade or occupation.

“The objects of this Industrial School are :—To provide a home for any child who is found begging or receiving alms; wandering, or without a home or place of abode; without proper guardianship, occupation or means of livelihood. To afford a shelter for children who are orphaned, or whose parents may be drunken or in gaol. Also for children whose parents or guardians cannot control them, but let them grow up in ignorance and vice. To place these children at such employments, and to instruct them in such useful knowledge as is suitable to their years and capacities.

“That there are in Toronto many children who need such a home as this, is a fact not well enough known.

“It is not intended, nor is it necessary, to make a crowd of ‘little square-toes’ of these children, any more than to oppress their brains or bodies after the Gradgrind fashion. In Dr. Barnardo's Homes ‘the children are *not* dressed in uniform, their hair is *not* cropped close to their heads, nor is life itself drilled out of them by the monotonous repetition of purposeless tasks.’ The principles of religion must be taught, and its precepts practised with reverence and loving enthusiasm. Truth, modesty, industry, thrift, these are essential things.

“A boy can be taught the care of a horse or cow; he can be taught farm-work on the grounds of the school; he can be taught a trade. And while these things are being taught him he can have, instead of hunger and rags, at least proper food and shelter, and a home-feeling; and in a few years can go out to earn a living, body and mind renewed, and his moral sense sharpened by his stay.

“It is no part of the function of

such a school to punish. That is for the Reformatory to do. The aim is, in the words of the British Home Secretary, 'To reform, reclaim and restore;' and it has been found, in the experience of such institutions in Aberdeen, Glasgow, Chelmsford, and elsewhere in the United Kingdom, that from *seventy to ninety per cent.* of the children brought up in them have been reclaimed from possibly vicious or useless lives, and made honest and good members of society."

It may not be amiss to state that the Industrial School Association of Toronto, under whose auspices the Victoria Industrial School is being organized, is quite voluntary in its character, though the Government have recognized the merits of its work, and granted it some forty acres of land and considerable financial aid. The Toronto City Council have also materially assisted the Association, while private individuals, concluding that there can be no better way in which to exercise their benevolence, have contributed largely to its finances. More funds are, however, needed to equip the school buildings and to erect additional accommodation as soon as it is found necessary. The present buildings are adapted to lodge one hundred boys and provide them with schoolrooms, workshops, etc. But it is anticipated that in a very short time accommodation will be required for six hundred, and the buildings have been so arranged that additions—or rather new buildings—may be erected according to a systematic plan. The school will be open to boys from all parts of the Province, providing that, in accordance with the Act, the local municipalities are willing to support the boy to the extent of one dollar per week.

Teachers throughout the Province can do much good to their own schools and to their localities by seeing that no boy belonging to the class

for which the school is intended is deprived of its advantages. A very generous Act has been passed, allowing any person to start proceedings that will result in the removal of neglected or self-willed boys to the Industrial, but it is likely that unless teachers exert themselves in this respect that no one else will. The main object of this article is to give information about the functions of the school, and to induce, if possible, all teachers to take an active interest in a work that affects them so closely, and may relieve them of much care and anxiety of heart. Certainly it is their duty as educators to do all that they can for all classes in an impartial manner, and not to neglect those whose needs are urgent in the extreme. A few extracts are appended from the Industrial Schools' Act to indicate generally the law on the question, and to point out the mode of procedure to be adopted in procuring places for lads in the school:

"In case the Public School Board of Trustees for any city or town, or the Separate School Trustees therein, establish an Industrial School, and provide the necessary building or buildings, either by purchase, lease or otherwise, and provide the other requisites for such Schools, and cause notice thereof to be given to the City Inspector of Public Schools, or in case of a Roman Catholic Industrial School then to one of the Inspectors of Separate Schools; the said Inspector shall make an examination of the school buildings so provided, and of their fitness for the reception of children, and shall enquire as to the other requisites provided, and shall enquire also into the means adopted for carrying on the School, and shall report the said particulars to the Minister of Education; and if the Minister is satisfied with the report of the Inspector, he may, in writing under his hand, certify that the School

is a fit and proper one for the reception of children to be sent there, and the School shall thereupon be deemed a certified Industrial School for the purposes of this act.

"The notice of the grant of this certificate shall forthwith be given by the Board to the Police Magistrate, and the Judge of the County Court, and shall likewise be inserted by the Board in the *Ontario Gazette*; and a copy of the *Gazette* containing the notice shall be conclusive evidence of the grant, which may also be proved by the certificate itself, or by an instrument purporting to be a copy of the certificate, and attested as such by the Minister of Education for the time being, or his Deputy.

"Any Board of School Trustees may delegate the powers, rights and privileges conferred upon such Board by this Act, respecting the establishment, control and management of an Industrial School, to any philanthropic society or societies incorporated under "*The Ontario Benevolent Societies' Act*," or under any other Act in force in this Province, and the said society or societies to which such powers are delegated shall have and may exercise all the powers so delegated, and this Act shall thereafter apply to the said philanthropic society or societies as fully as to the said Boards; provided, nevertheless, that the Chairman and Secretary of the Board of Public School Trustees in the city or town in which the Industrial School is situated, or under whose control it is placed, and the Public School Inspector of the city or town, shall be members of the Board of Management of said society when acting under powers delegated by the Board of Public School Trustees, and the Chairman and Secretary of the Separate School Board shall be members of the Board of Management, when such society is acting

under powers delegated by the Separate School Board.

"Any person may at a special sitting bring before the Police Magistrate or before the Judge of the County Court, and, except in cities where there is a Police Magistrate, any one or two Justices of the Peace, any child apparently under the age of fourteen years, who comes within any of the following descriptions, namely:

"Who is found begging or receiving alms, or being in any street or public place for the purpose of begging or receiving alms.

"Who is found wandering, and not having any home or settled place of abode, or proper guardianship, or not having any lawful occupation or business, or visible means of subsistence.

"Who is found destitute, either being an orphan, or having a surviving parent who is undergoing penal servitude or imprisonment.

"Whose parent, step-parent or guardian, represents to the Judge or Magistrate that he is unable to control the child, and that he desires the child to be sent to an Industrial School under this Act.

"Who by reason of the neglect, drunkenness or other vices of the parents, is suffered to be growing up without salutary parental control and education, or in circumstances exposing him to lead an idle and dissolute life.

"Who has been found guilty of petty crime, and who, in the opinion of the Judge or Magistrate before whom he has been convicted; should be sent to an Industrial School instead of to a gaol or reformatory.

"No formal information shall be requisite to authorize proceedings being taken under the preceding section, but the Judge or Magistrate, before issuing his order, shall have

such child brought before him, and shall, in its presence, take evidence in writing under oath of the facts charged, and shall make reasonable enquiry into the truth thereof.

"If the Judge or Magistrate is satisfied on enquiry that it is expedient to deal with the child under this Act, he may order him to be sent to a certified Industrial School; which order shall be in writing, and

shall specify the name of the School, and the time for which the child is to be detained in the School, being such time as to the Judge or Magistrate seems proper for the teaching and training of the child, but not in any case extending beyond the time when the child will attain the age of sixteen years."

COLLEGIATE INSTITUTE,  
Toronto, Feb. 25, 1887.

## SOME DANGEROUS METAPHORS.

BY E. A. HINSDALE.

MR. JAMES CURRIE, in his valuable *Common School Education*, very properly commends the teacher who magnifies his office. High views of duty stimulate labour to attain a high standard of excellence, and a profound conviction of the true dignity of his profession and work is a safeguard against the temptation to seek vulgar applause by pursuing appearances rather than realities. He also points out the mischief flowing from exaggerated views of the functions of the school. Such views turn the attention of the teacher away from what is attainable to the impractical and delusive; failure to reach the overlofty ideal brings disappointment; and the faith that the school can do *all* will be succeeded by the doubt whether it can do *anything*, and conscientious labour will then be withheld. To determine what the school can do and should do, and what it cannot do and should not attempt to do, is a thing at once very desirable and very difficult.

Mr. Currie's main thought may be greatly expanded. There are the same tendencies to exalt and belittle education that there are to exalt and belittle the school. And this result is followed by the same result in the

one case as in the other, only in a more striking degree. Looking upon the undoubted magnitude of the results achieved by training the minds and developing the characters of men, philosophers and educators have sometimes formed very exaggerated views of educational possibilities. Des Cartes, for example, said: "Sound understanding is the most widely diffused thing in all the world, and all differences between mind and mind spring from the fact that we conduct our thoughts over different routes." Even the sober John Locke said: "Out of one hundred men, more than ninety are good or bad, useful or harmful to society, owing to the education they have received." Helvetius is even more extravagant: "All men are born equal and with equal faculties, and education alone produces a difference between them." Such utterances as these are, perhaps, productive of some good; but, like the famous saying commonly accorded to Fletcher of Saltoun, "If a man were permitted to make the ballads, he needn't care who should make the laws of a nation," they must be understood with ample allowance for rhetorical exaggeration. That they belong to the popular literature of education, and not to the literature



of educational science, is obvious to all men who have clearly observed the history of the individual minds and lives, no matter whether they are familiar with the discoveries of science concerning hereditary descent or not.

The tendency to exaggerate the educational function, together with a misapprehension of the nature of the mind, has produced these famous metaphors: "The mind is a blank sheet of paper, on which you may write what you please"; "A young child is a ball of wax, that you may mould as you choose"; "The child is a block of marble, that you may chisel into any form you will" Perhaps these metaphors answer a good purpose as exhortations to teachers who may need strong stimulus, but they have no place in the science of education, and are often misleading and mischievous.

First, these figures wholly misrepresent the nature of the mind, and, therefore, the nature of education. So intangible is mind that we are compelled to resort to the material world for language to express our observations and thoughts concerning it and its phenomena. We seek out resemblances between mental and material things. That is, the language of mental and moral science, and of the mental and moral arts, is figurative. Thus, "spirit" first meant air or wind, to "comprehend" was to hold in your arms, to "imagine" was to make a picture, and to "ponder" was to weigh. All this is commonplace. But it may not be equally commonplace to remark that many metaphors belonging to our philosophical vocabulary are suggested by mechanics and mechanical processes. Perhaps it was essential in making up a language to express the phenomena of mind to include words belonging to the statics as well as the dynamics of nature,

and terms belonging to the inorganic as well as to the organic world; but that part of our philosophical vocabulary which is derived from dynamics rather than statics, and from the living rather than the dead, is much more highly suggestive and much more true to the facts. Even the comparison of vital phenomena to the inert is very misleading. The muscles and tendons of the human body are somewhat like the shafting and belting of a machine; but they are instinct with life and motion, and are all the time undergoing organic decay and repair, which the parts of the machine are not.

Secondly, the metaphors given above are suggested by mechanical processes. The mind is not a blank tablet on which you can write what you please; it is not a lump of clay to be fashioned by human hands; it is not a block of marble to be cut into a new form. It is rather faculty to be strengthened or weakened, to be directed wisely or unwisely, by education. The familiar terms, "mould," "fashion," "form," "chisel," "cut," "write on," etc., are, therefore, all misleading, since they suggest material substances and physical operations. It may be said, "a metaphor, no more than a parable, walks on all fours"; "we cannot, considering the poverty of our psychological vocabulary, dispense with these uses of these words"; all of which must be admitted, with the cautionary remark that those who use them need to guard themselves against their false suggestions. The mind is not an inert and dead substance of any kind, on which mechanical effects are produced. The mind is life, activity and growth; and the language that comes from such objective phenomena as these is altogether more true and helpful than these metaphors. How much higher the educational outlook suggested by the words

“growth,” “faculty,” “organs,” “functions,” “development,” and “unfolding,” than by the terms “tablet,” “wax,” “mould,” “chisel,” and the like! It is very true there is a wide difference between the life of a tree and the life of a horse, and still more between the animal and the spiritual life of man; but here we find our closest resemblances to spiritual things, and our best educational metaphors.

Probably there are no teachers who think a pupil a sheet of paper, a ball of wax, or a marble slab; but there are plenty of teachers whose educational theories and methods are suggested by these familiar figures. Treating the mind-material (so to speak) as inert and passive in their hands, they are “writing” and “engraving” on it, “moulding” and “forming,” “cutting” and “fashioning” it, to their hearts’ content. Whereas, what all teachers should do is to treat mind-material as alive and growing, plastic indeed, but yet ascertaining its own native energy, capable of indefinite development. Teachers should be trainers and developers of youth, not artificers or even artists.

“NONE WILL MISS THEE.”

Few will miss thee, friend, when thou  
For a month in dust has lain,  
Skillful hand and anxious brow,  
Tongue of wisdom, busy brain—  
All thou wert shall be forgot,  
And thy place shall know thee not.

Shadows from the bending trees  
O'er thy lowly head may pass;  
Sighs from every wandering breeze  
Stir the long, thick churchyard grass—  
Wilt thou heed them? No; thy sleep  
Shall be dreamless, calm and deep.

Some sweet bird may sit and sing  
On the marble of thy tomb,  
Soon to flit on joyous wing  
From that place of death and gloom,  
On some bough to warble clear;  
But these songs thou shalt not hear.

Some kind voice may sing thy praise,  
Passing near thy place of rest,  
Fondly talk of “other days”—  
But no throb within thy breast  
Shall respond to words of praise,  
Or old thoughts of “other days.”

Since so fleeting is thy name,  
Talent, beauty, power and wit,  
It were well that without shame  
Thou in God's great book wert writ,  
There in golden words to be  
Graven for eternity.

—Chambers' Journal.

CORRESPONDENCE.

AN EXPERIMENT IN RELIGIOUS INSTRUCTION.

To the Editor of THE MONTHLY:

SIR,—The suggestion of the Education Department that “arrangements may be made by the trustees for closing the ordinary school work earlier than the usual hour, on certain days, so that time may be given for religious instruction,” is a valuable one, and may be readily turned to good practical account. Experiment in one of our cities some years ago

proved the impossibility of accomplishing much in the way of religious instruction after school hours. The teachers considered themselves under no responsibility to remain when school work was done, and left accordingly, their example being followed by a portion of the scholars. Those who stopped behind, freed from the teacher's eye, fell into disorder. Discipline was impossible, and the scheme speedily collapsed. So long as school-children are school-children, similar experiments will

end in like fashion. If religious instruction is to be given with profit, especially where the number of scholars is large, the presence and co-operation of the teachers is requisite. This cannot reasonably be looked for outside the usual hours. On the other hand, teachers, as a rule, will be found ready heartily to assist when the ordinary time-limit is not exceeded; and trustees will with equal willingness grant the necessary shortening of ordinary work on at least one day in the week.

The letter of the regulations seems to contemplate only that the clergy shall "give religious instruction to the pupils of their own denomination." This is scarcely practicable either in town or country. In the large town schools the minister would have in the pupils of his own denomination a quite impracticable class, made up of kindergarten infants, young men and women from the High School, and all the intermediate grades; and in the County Schools the dividing process would result in a miserable handful to each visiting minister. The writer is not aware of any instance in which the denominational method has been tried. It could scarcely succeed.

It is understood, however, to be quite in harmony with the spirit of the regulations that clergymen of different denominations should act in concert in the matter, and so arrange that each in turn shall give instruction to all the scholars. This plan has been under trial for the past twelve months in the High and Public Schools of the town of Bowmanville. It has wrought so smoothly and well that a good purpose may be served by a brief sketch of it in detail. A preliminary consultation with all the clergymen of the town was had, as well as with members of the school board and teaching staff. General approval of the scheme was

found to prevail. A petition from the Ministerial Association was laid before the School Board, and supported by a deputation. The Board at once, and cordially, granted the necessary time,—the last half hour on Friday afternoon of each week, and required the co-operation of the teachers during the time thus allotted to religious instruction. The teachers have manifested unflagging interest in the work, and have materially assisted in the success which has attended it.

The schools of the town are so arranged that, to reach any considerable portion of the scholars, the four ministers who have undertaken to give instruction require all to be on duty each Friday. There are no large assembly rooms. Where there are such, fewer instructors would be needed, and the individual burden therefore lightened. A "plan" was made, so arranged that the ministers follow one another in regular order from room to room, each retaining his room for a month. The same selections from the "Scripture Readings" are read in all the rooms, morning by morning, the passages thus read during the week becoming the basis of instruction on Friday afternoon. Each minister is left quite at liberty as to matter and form. It is well understood that denominational peculiarities would be out of place. The scholars are generally found prepared with suitable hymns, and attention is also given to the recitation of the Commandments.

The arrangements thus sketched have now been in operation for twelve months, and so far as known, have given much satisfaction alike to trustees, teachers, parents and scholars. Though involving the sacrifice of valuable time on the part of the ministers, they have found much pleasure and profit in the work. It materially aids them in keeping

in touch with the children and youth of the place. The chief profit accrues to the pupils. The Friday half-hour leads to closer attention to the daily readings from the teacher's desk; and adds emphasis to the daily effort of the teachers to inculcate right principles. Reverence for the Holy Book and for sacred things is increased, and the necessity of "repentance toward God, and faith toward our Lord Jesus Christ" as the fountain

and source of holy living, kept more constantly in view. The work of the ministers could be made much more profitable, were the teachers at liberty to question and drill the scholars daily on the facts contained in the selections. With such teachers as are found in almost all the schools of the Province, would not the additional liberty be in safe hands?

*Bowmanville.* R. D. FRASER.

### EDITORIAL NOTES.

WE direct the attention of our readers to the timely article of Mr. Wilkins on "Science Teaching in the Secondary Schools." Mr. Wilkins, who is a teacher of some experience in our schools, writes on a subject with which he is practically familiar, and his experience, we have no doubt, is that of very many science masters in our schools. We shall be glad to hear from other masters, on the points referred to by Mr. Wilkins.

EASTERN Ontario is moving decidedly and energetically in the direction of having a School of Science in that part of the Province. The authorities and friends of Queen's, Kingston, taking time by the proverbial forelock, interviewed the Premier, and put the claims for the establishment of the school clearly and strongly before the Government. Mr. Mowat gave the usual official reply to the large deputation that waited on him—"The question will be carefully considered." It seems to us that whatever measures tend to call into activity local enterprise and the liberality of the citizen in every part of the country should be generously recognized and handsomely sustained.

Obviously for the higher work in learning and research, College or University—in Ontario, and perhaps the wide world over—must look to its more wealthy men to endow and maintain institutions, whose function it is to make ample provision for our wants, as a people, in all the departments of intellectual endeavour.

### RELIGIOUS INSTRUCTION IN PUBLIC SCHOOLS.

AN arrangement made between the Protestant clergy and the Trustees of the Lindsay Public Schools to have religious instruction given once a week, irrespective of the denomination of the pupils, has been in operation for a little over two months. The plan adopted is as follows:—

There are five buildings containing thirteen rooms, that is to say  $4 + 3 + 2 + 2 + 2 = 13$ . There are five clergymen, two Methodists, one Church of England, one Presbyterian, one Baptist. Each clergyman takes charge of one building. Where there are more than two rooms, the pupils of two rooms are taught together. It is intended that each clergyman shall take charge of a different building at the end of three months.

The lessons are given Monday afternoon from 1.30 to 2.30. Two lessons of half an hour each, in each building.

The subjects consist chiefly of Old Testament history, books of the Bible, moral duties.

The pupils generally shew a lamentable ignorance of Bible facts. There has been no objection on the part of parents.

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#### SUPPORT FOR COLLEGE OF PRECEPTORS.

WE are pleased to see that this new departure in the organization of teachers is finding support both in England and the United States of America. In England a petition is being signed by graduates and others interested in education and the condition of teachers, with the intention of sending it to Sir Lyon Playfair, M.P., with the request that he will use his influence to have some measure passed for the enrollment of teachers. We have no doubt the honourable gentleman will only be too willing to attend to this request, as a few years ago he endeavoured to do the same of his own motion. Here in America, we have the Hon. Mr. Draper, Chief Superintendent of Education for the State of New York, advising the formation of a council representative of all interests in the State, and appointed by the Governor, to aid by suggestion, advice, etc., how properly to spend the money placed at the disposal of the Education Department. Thus, two of the leading features of the College of Preceptors for Ontario are finding favour in the educational world. And no doubt the third one—the relation of the enrolled body to the Government of the day—will soon be successfully grappled with in all English-speaking communities. The sooner the better, for the Government will ultimately have to accept

one of two alternatives. It must make teachers civil servants, as is now being done in Germany, or put the teaching profession on the same footing as the other professions—relinquishing all interference with the law of supply and demand. At present teachers are in a most unnatural position, which cannot continue. As soon as they combine and demand to be treated as lawyers and doctors are treated on the one hand, or as Inland Revenue officers on the other, the present paternal, and more unjust than paternal, system must give way. Under the first order of things, the State would have to depend on the attractions of the profession to secure a sufficient supply of efficient men and women to take charge of the schools. One thing is certain, most if not all the grievances of which our teachers now complain would disappear. Under the other alternative, teachers would willingly accept smaller remuneration, because of the security of tenure, pensions, and other advantages they would obtain as civil servants. At present they have the advantages of neither position. They are as much controlled by the Department as though they were in the service of the Crown, but hold their appointments at the will of one man, or by a body of men not controlled by the Minister. As to their salaries, these also are managed by the Department, *i.e.*, by the Minister of Education or some one for him, who, if a sufficient supply of cheap teachers cannot be obtained, have only to lower the standard or grant permits, to secure as large a supply as may be wished. The truth is the teachers of the country are heavily handicapped. It were well, if they either had only to bargain with the public or bargain with the Government. Their position is as intolerable as it is unnatural, and so long as the present system is maintained, so long must general discontent exist.

SCHOOL WORK.

MATHEMATICS.

ARCHIBALD MACMURCHY, M.A., TORONTO,  
EDITOR.

EDUCATION DEPARTMENT,  
TORONTO.

JULY EXAMINATIONS, 1886.

First Class Candidates—Grade C.

TRIGONOMETRY.

Examiner—J. A. McLellan, LL.D.

1. Define *circular measure*. Assuming  $\pi^2$  to be the circular measure of two right angles, express in degrees the angle whose circular measure is  $\theta$ .

Express the angle  $\tau\theta\theta\theta$  in degrees, etc.

Ans.  $3'. 26'' . 3$ .

2. Define the cosine of an angle, and trace the changes in the value and sign of the cosine as the angle increases from  $0^\circ$  to  $270^\circ$ .

Find  $\tan A$  from the equation  $\sin^2 A + 5 \cos^2 A = 3$ .

Ans.  $\tan A = \pm 1$ .

3. Prove geometrically that  $\sin(A - B) = \sin A \cos B - \cos A \sin B$ ,  $A$  and  $B$  being positive angles less than  $90^\circ$ .

4. Prove the following relations—

(1)  $\tan^2 A - \sin^2 A = \tan^2 A \sin^2 A$ .

(2)  $\tan A = \frac{\sin A + \sin 2A}{1 + \cos A + \cos 2A}$

(3)  $\frac{\cos(x - 3y) - \cos(3x - y)}{\sin 2x + \sin 2y} = 2 \sin(x - y)$

4. (3)  $\frac{\cos(x - 3y) - \cos(3x - y)}{\sin 2x + \sin 2y} =$

$$\frac{\cos\{2(x - y) - (x + y)\} - \cos\{2(x - y) + (x + y)\}}{2 \sin(x + y) \cos(x - y)}$$

$$= \frac{\sin 2(x - y)}{\cos(x - y)} = 2 \sin(x - y).$$

5. A tree subtends an angle whose tangent is 2 at a point on the horizontal plane on which it stands, and 90 feet farther off it subtends an angle whose tangent is  $\frac{1}{2}$ ; find the height of the tree.

Ans. 60 ft.

6. Prove the following—

(1)  $\cos a + \cos \beta - \sin a \sin(a + \beta)$   
 $= 2 \cos^2 \frac{1}{2}(a + \beta) \cos a$

(2)  $\cos A - \sin A \tan \frac{1}{2} A$   
 $= \cos 2A + \sin 2A \tan \frac{1}{2} A$

(3) If  $\cot x = n \cot(a - x)$ , then  
 $\sin(a - 2x) = \frac{n - 1}{n + 1} \sin a$

6. Prove (1)  $\cos a + \cos \beta - \sin a \sin(a + \beta)$   
 $= 2 \cos^2 \frac{1}{2}(a + \beta) \cos a$   
 $= \cos a + \cos \beta - \sin^2 a \cos \beta - \sin a \cos a \sin \beta$   
 $= \cos a \{1 + \cos a \cos \beta - \sin a \sin \beta\}$   
 $= \cos a \{1 + \cos(a + \beta)\} = 2 \cos^2 \frac{1}{2}(a + \beta) \cos a$

(2)  $\cos A - \sin A \tan \frac{1}{2} A$   
 $= \cos 2A + \sin 2A \tan \frac{1}{2} A$   
 $= \cos A \cdot \cos \frac{1}{2} A - \sin A \sin \frac{1}{2} A$   
 $\quad - \cos 2A \cos \frac{1}{2} A + \sin 2A \sin \frac{1}{2} A$   
 $= \cos(A + \frac{1}{2} A) = \cos(2A - \frac{1}{2} A)$

(3) If  $\cot x = n \cot(a - x)$   
then  $\sin(a - 2x) = \frac{n - 1}{n + 1} \sin a$

$$\frac{\cos x}{\sin n} = n \frac{\cos(a - x)}{\sin(a - x)}$$

$\cos x \sin(a - x) = n \cos(a - x) \sin x$   
 $\sin\{(a - x) + x\} + \sin\{\overline{a - x} - x\}$   
 $= n [\sin\{\overline{a - x} + x\} - \sin\{\overline{a - x} - x\}]$   
 $\sin a + \sin(a - 2x) = n \sin(a - x)$   
 $\sin(a - 2x)$

$\therefore \sin(a - 2x) = \frac{n - 1}{n + 1} \sin a$

7. The angle of elevation of a tower of height  $h$  is  $a$ , how much farther off is the point from which the elevation is  $90^\circ - a$ .

7. If  $b$  is base of  $\triangle$  when  $a$  is  $>$  of elevation  $x = \text{dist. off when } >$  of elevation is  $90^\circ - a$ , then  $\cot a = \frac{b}{h}$ ,  $\cot(90^\circ - a) = \frac{x + b}{h}$

$$\therefore x = h \left\{ \cot 90^\circ - a - \cot a \right\}$$

$$= h \left\{ \frac{h}{b} - \frac{b}{h} \right\} = \frac{h^2 - b^2}{b}$$

8. From two points  $A$  and  $B$  in the same vertical plane with a tower, and 66 feet

apart on a horizontal plane, the elevations of the tower are  $20^{\circ} 30'$ ,  $21^{\circ} 20'$ ; find its height. Given

$$L \sin 29^{\circ} 30' = 9.6923388; L \sin 8^{\circ} 10' \\ = 9.1524507, \text{ Log } 8.3231 = 9.202851.$$

$$L \sin 21^{\circ} 20' = 9.5608546, \text{ Log } 66 \\ = 1.8195439, \text{ Log } 8.3232 = .9202903.$$

$$\text{Ans. } 83.2313 \text{ ft.}$$

9.  $ABC$  is a triangle, prove

$$(1) \tan A + \tan B = \sin C \sec A \sec B.$$

$$(2) \frac{a-b+c}{a+b+c} = \frac{\sin A - \sin B + \sin C}{\sin A + \sin B + \sin C}.$$

$$(3) b^2 \cos^2 C - c^2 \cos^2 B = b^2 - c^2.$$

$$9. (3) b^2 \cos^2 C - c^2 \cos^2 B = b^2 - c^2$$

$$\frac{(a^2 + b^2 - c^2)^2}{4a^2} - \frac{(a^2 + c^2 - b^2)^2}{4a^2} = \\ \frac{(a_2 + b^2 - c^2 + a^2 + c^2 - b^2)(a^2 + b^2 - c^2 - a_2 - c^2 + b^2)}{4a^2}$$

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

## MODERN LANGUAGES.

Editors: { H. I. STRANG, B.A., Goderich.  
W. H. FRASER, B.A., Toronto.

### EXERCISES IN ENGLISH.

1. Change the voice of the verbs in the following:—

(a) No one will believe the story he tells.

(b) Among them the following may be named.

(c) He evidently wrote the letter before the result was known.

(d) The children were taken charge of by a neighbour.

(e) It would probably never have been thought of.

2. Substitute words or phrases of equivalent meaning for those italicized:—

(a) The garrison was *compelled to capitulate*.

(b) The revenue was *inadequate to the needs of the province*, and trade was much *impeded*.

(c) The governor *screened delinquents from the consequences of their misdeeds*, sided with the *dominant party*, and made *unauthorized disbursements from the treasury*.

(d) In this district there was also an *abortive rising* which was speedily *repressed*.

(e) He endeavoured to allay political *commotion* and soften the *asperities* of party strife, and with *laudable* motives stretched his authority on the side of *clemency* to the rebels.

3. Change to indirect narrative:—

"Take you a Frenchman a piece," said he to his captains, "and leave me the Spaniards; when I haul down my colours I expect you to do the same, and not till then."

4. Change to direct narrative:—

He went on to say that if he did not hear from her before the end of that week he would take for granted that she had changed her mind, and would consider himself free to make other arrangements.

5. Combine into not more than four sentences:—

Two men were walking together. A bear suddenly met them. One climbed quickly into a tree. He hid in the branches. The other was unable to escape. He saw this. He fell flat on the ground. The bear came up. It smelled him all over. He held his breath. He pretended to be dead. The bear soon left him. Bears will not touch a dead body. So people say.

6. Expand the following sentence into as many simple sentences as there are verbs in it:—

Shortly after finishing the business on which he had come he received an invitation to dinner, and, accepting it, found himself in company with many distinguished guests, among whom he preserved a modest demeanour, taking but little part in the conversation.

7. Distinguish the following:—

(a) He has been (was) secretary of it for several years.

(b) Are (aren't) you glad to see them again?

(c) You will (shall) suffer for this.

Which is the better form:—

(a) No admission (admittance) except on business.

(b) I will go providing (provided) you come with me.

(c) Struck with (by) lightning. Struck by (with) astonishment.

8. Correct any errors in the following:—

(a) I won't have another opportunity of seeing it.

(b) Were either of you meddling with my desk?

(c) What did you say was the capital of Belgium?

(d) He could not have known that it was she that done it.

(e) I thought I would have had time to have learned it in school.

(f) Nobody but the Brown's know about it.

(g) I wish it wasn't so dark.

(h) I don't like to go without I hear from from him.

(i) I believe it is just as cold if not colder than yesterday.

(j) The state of spiritual folly is one of the most universal evils in the world.

(k) I have only heard from him twice since he has moved to Toronto.

(l) What makes you act so silly?

## FRENCH.

(Continued from page 72.)

*Se passer de sa mère*—He cannot do without me. Could you do without my help. They must do without money. We cannot do without food. Try to do without it.

*Que pouvait devenir cet enfant?*—What will become of your brother? What has become of him? What becomes of you? What became of you during all that time? I don't know what has become of my old master.

*C'est moi, répondit Joséphine.*—Who has done that? I did, she replied. Who will go? I will. Who has any apples? I have. Who is fond of apples? I am, he replied.

*Dans la cour*—In my pocket. In England. In Paris. In the room. In France. In London. She paints in water-colours. Come in the morning. The best boy in the class.

*Une femme était entrée dans le village.*—He entered the room. After he had entered the Church he looked around. As he entered the house he saw me at a window on the other side of the street. You do nothing but come in and out of this room.

*Il avait entendu dire à son père.*—I have heard your brother say that he would not go. Have you ever heard my sister say it? No, but I heard your mother say it.

*C'étaient des fraises.*—It was I. It was not you: sisters. It was you. It was the Romans. It is we who have written that letter. Who is it?

*Envers les autres*—He has been very kind to me. Turn your face towards the light. You are very unjust to her. He was going towards Paris. About five o'clock. Towards the end of the year. He was always very obliging to others.

*Qu'y a-t-il de si pressé?* He told me something very important. What is there extraordinary in that? I see nothing funny in it.

*Plus de cent.*—He says that he saw more than a thousand armed men in the village. There were fewer apples than pears. He works more than you. He is much less tall than you.

*Toute tremblante*—She was quite frightened. She was quite confused. Your sisters were quite moved (*émues*). My nieces were quite young. The two girls were quite astonished.

*Qu'a donc ton frère?*—What is the matter with him? I do not know what is the matter with her. Tell me what is the matter with your brother. What was the matter with you?

*Dans huit jours—En huit jours*—He cannot do it to-day; he will do it in a day or two. How long will it take him to do it? He can finish it in four days. They will start for America a year hence. I do not think that you can learn music in so short a time. Come back in an hour. He completed it in an hour. He will come back in a fortnight. I have learnt all these rules in a fortnight.—Reprinted from *D'Auquier's Children's Book of French Composition*.



## CLASSICS.

G. H. ROBINSON, M.A., TORONTO, EDITOR.

## BRADLEY'S ARNOLD.

BY M. A.

## Exercise 32 B.

1. Fidem suam interponit se facturum esse ut legatis liceat tutis domum discedere. 2. Huic regi, propter indolem ceteris hominibus vix ferendam, superbo nomen indidere. 3. Quæ res argu nento est neminem Romanum ei certamini interfuisse. 4. Fratris tui, viri clarissimi, tot sunt ac tantæ res gestæ, ut jam omnibus hominibus auditæ sint (106) laudatæ et perlectæ. 5. Scimus transfugarum nomen omnibus hominibus odio esse et execrabile; sed oramus obsecramusque, ut hæc nostra transitio nobis neque fraudi sit neque honori. 6. Nobis ne in omnium quidem otio otiosis esse licuit. 7. Quod (78) tam nefarium consilium vix crediderim tibi cognitum probatumque esse. 8. Hanc rem quæ jam omnibus est in ore, mecum heri communicavit, puto id ad te magis quam ad me pertinere. 9. Collega meus quum mihi amittio venerit victum tibi et arma suppeditare potero.

## EXERCISE 48 A.

1. Alia (48) alii sequuntur homines, horum frater alter iisdem studiis ac artibus quibus pater suus dedit operam, alter admodum adolescens ad rempublicam accessit. 2. De hac re aliter tu atque ego iudicas; potuisti bonum te civem præstare, et in civitate libera liber (or cum liberate) vivere; iis quas libertas habet laboribus ac periculis divitias ac voluptates prætulisti. 3. Hi omnes alius, alia ratione, de genere humano bene meriti sunt; omnes ceteris prodesse, quam sibi consulere maluerunt. 4. Alius aliud appetimus; divitiarum alii; alii voluptatum studiosi sunt; in magistratibus habendis alii, in potestate, in reipublicæ procuratore, alii denique infavore, ingratiâ, in auctoritate, vitam beatam ponunt. 5. His auditis, alius alium intueri milite, quid se imperator facere vellet mirari, cur sibi potius quam ipsi irasceret. 6. Tu me alero quoque

verbo collaudas; idem summæ perfidiæ incusas; velim memineras aliud esse vera, aliud jucunda dicere. 7. Jam hostes diversi fugere ceteri abjectis armis ad unum capti sunt; fugientium plerique occiduntur (179), pauci iram hostium deprecantur, nulli par-citur,—(or pauci ut sibi parcatur poscunt, impetrat nemo.) 8. Constitimus plerique, alius alium taciti intuentes, quis nostrum primus loquuturus foret mirati; ego autem atque Lælius, alter alterum expectantes, conticescebamus. 9. Duobus comparatis exercitibus, uno hostium castra aggrediuntur; altero urbem custodiunt; illi infecta re rediunt, hos subitus invasit pavor; itaque utrinque res infelicissime gesta est.

## SCIENCE.

## HOUSE PLANTS AS SANITARY AGENTS.

—Dr. Anders has published the results of an almost-continuous series of personal experiments, extending over a period of eight years, and has succeeded in confirming the theory that plants and flowers, particularly when cultivated indoors, are worthy to be placed in the foreground of Sanitary Agents. He also establishes from a mass of evidence, the agency of living plants as preventives in consumption of the lungs, and states they are capable of rendering much service in other diseases. The book is published by Lippincott & Co., Philadelphia.

INCREASE OF TEMPERATURE IN LAKE SUPERIOR MINES.—H. A. Wheeler has made observations of the differences of temperature in the copper mines of Keweenaw Point, Lake Superior, which, being now among the deepest mines in the United States, present an excellent opportunity for obtaining data as to the rate of thermal increase with descent into the earth. While the usual thermic gradient is from fifty to fifty-five feet for an increase of temperature of 1° Fahr., exceptional gradients, both higher and lower than this, have been obtained in some places. Measurements were computed in five mines having depths run-

ning from six hundred and seventeen feet to nineteen hundred and fifty feet, with distances between rating stations in each about one hundred feet less than the total depth of the mines. The results obtained show that the thermic gradient in this region—the average of the five mines giving ninety-nine feet to the degree—is one of the lowest that has ever been noted. A view to the cause of the low gradient is indicated by the variations between the different mines. Keweenaw Point is a tapering peninsula extending some seventy miles toward the middle of the lake. None of the mines are, consequently, very far from the water; and those nearest to the lake-shore have the lowest gradient, while those farther away have the higher or more rapid rate of increase. Considering the magnitude of Lake Superior, and the fact that only its surface waters change in temperature, while the great body of its deep waters remains at the temperature of maximum density, or about 39° Fahr., the lake appears to act "as a great cold blanket," giving the general coolness to the rocks which has been observed in the region, and preventing the rapid rise of temperature within the depths to which the mines have penetrated, which occurs under normal conditions.

### THE ROCKY MOUNTAINS.

Describing the British Columbian Rocky Mountains before the British Association, George M. Dawson remarked that the term "Rocky Mountains" is frequently applied in a loose way to the whole mountainous belt which borders the west side of the North American Continent. The mountainous belt is, however, preferably called the Cordillera region, and includes a great number of mountain systems or ranges, which on the fortieth parallel have a breadth of not less than seven hundred miles. Nearly coincident with the forty-ninth parallel, however, a change in the general character of the Cordillera region occurs. It becomes comparatively strict and narrow, and runs to

the fifty-sixth parallel, or beyond, with an average width of about four hundred miles only. This portion of the western mountain-region comprises the greater part of the province of British Columbia. It consists of four main ranges, or systems of mountains, each including a number of component ranges. These mountains are, from east to west, the Rocky Mountains proper, mountains which may be classed together as the gold ranges, the system of the Coast Ranges of British Columbia (sometimes improperly named the Cascade Range), and a mountain system, the unsubmerged portions of which constitute Vancouver and the Queen Charlotte Islands. The system of the Rocky Mountains proper, between the forty-ninth and fifty-third parallels, has an average width of about sixty miles, which, in the vicinity of the Peace River, on the fifty-sixth parallel, decreases to about forty miles. It is bounded on the east by the Great Plains, which break into a series of foot-hills along its bases, and on the west by a remarkably straight and definite valley occupied by the Columbia, Kootenay, and other rivers. Since the early part of the century the trade of the fur companies has traversed this range, chiefly by the Athabasca and Peace River Passes; but, till the explorations effected by the expedition under Captain Palliser in 1858-'59, nothing was known in detail of the structure of the range. During the progress of the railway explorations a number of passes were examined, and in 1883 and 1884 that part of the range between the forty-ninth parallel and latitude 51° 30' was explored and mapped in some detail in connection with the work of the Canadian Geological Survey by the author and his assistants. Access to this, the southern portion of the Rocky Mountains within Canadian territory, being now readily obtained by the railway, its mineral and other resources are receiving attention, while the magnificent Alpine scenery that it affords is beginning to attract the notice of tourists and other travellers.—*Popular Science Monthly.*

## CLASS-ROOM.

L. B. DAVIDSON, Head Master Public School,  
Sault Ste. Marie, Editor.

## LINDSAY PUBLIC SCHOOL.

JUNE, 1886.

## GEOGRAPHY.

*Fourth Class Senior.*

1. Define archipelago, channel, delta, hail, tide.
2. Explain and illustrate by a diagram, "The earth's axis is inclined to the plane of its orbit."
3. Describe the chief mountain ranges of the United States.
4. Where are the sun's rays vertical when we have the shortest day?
5. What are the chief productions of China, Florida, France, Jamaica,<sup>1</sup> Newfoundland?
6. What is the eastern terminus of (a) The Grand Trunk Railway, (b) The Intercolonial Railway, (c) The Canada Pacific Railway?
7. Explain the causes which produce (a) Day and night; (b) The seasons; (c) Variation in the length of day and night.
8. Draw an outline map of the Dominion of Canada, indicating the provinces, districts and territories.

*Fourth Class Junior.*

1. Define Dew, Equator, Horizon, Oasis, Sound.
2. What waters are connected by (a) The Welland Canal, (b) The Rideau Canal?
3. What and where are Bulgaria, Burmah, Herat, Tamatave, Warsaw?
4. Classify the cities of Canada under the following heads:—(a) Seaports, (b) Lakeports, (c) Inland.
5. What is meant by a natural boundary? Illustrate your answer.
6. When have we (a) Equal day and night; (b) The longest day; (c) The shortest day?
7. Give the relative position of each of the four largest islands of the West Indies.
8. Locate the following pleasure resorts:—(a) Niagara Falls, (b) Thousand Islands, (c) Chautauqua, (d) Grimsby, (e) Muskoka Lake, (f) Sturgeon Point.

9. Draw a map of South America, showing the countries and chief rivers.

*Third Class Senior.*

1. Define cataract, harbour, iceberg, plateau, volcano.
2. What places are remarkable for (a) pearl fisheries; (b) cod fisheries; (c) coal mines; (d) coffee; (e) sugar?
3. Name and locate the cities of Ontario.
4. What and where are Aden, Bahama, Congo, Malacca, Mississippi?
5. Draw a map of Mariposa, Ops and Emily, showing the position of Downeyville, Lindsay, Little Britain, Manilla, Mount Horeb, Oakwood, Omeme, Reaboro, Woodville.

*Third Class Intermediate.*

1. Define gulf, mountain, river, strait, tributary.
2. What and where are Eric, Magellan, Mozambique, Niagara, Panama?
3. Name in order the counties in Ontario on Lake Ontario, with their county towns.
4. What trees growing in Ontario are cut down for the following purposes:—(a) House building; (b) Fence rails; (c) Fire wood?
5. Draw a map of the County of Victoria, showing the townships and largest lakes.

*Third Class Junior.*

1. Define bay, cape, isthmus, lake, peninsula.
2. What and where are Andes, Behring, Ceylon, Greenland, New Zealand?
3. What direction would you take to reach (a) Bobcaygeon; (b) Downeyville; (c) Fenselon Falls; (d) Kinmount; (e) Manvers; (f) Oakwood; (g) Omeme; (h) Woodville?
4. Name the domestic animals found in the Province of Ontario.

## LITERATURE AND HISTORY.

*Fourth Class Senior.*

*Readers may be used.*

Boadicea—Page 35.

1. What countries were included in the Roman Empire A.D. 61?

2. What is the religion of the Romans, and of the Britons?

3. Explain, "the Gaul is at her gates." "Other Romans," "armed with thunder," "clad with wings."

4. "Regions Cæsar never knew." What regions? Who was Cæsar?

5. Define harmony, chorûs, ruffians.

6. Name three other poems by Cowper.

Lochinvar—Page 169

7. What is meant by the Border?

8. Define "brake," "ford," "laggard," "dastard," "bridal," "goblet," "galliard," "fume," "croup," "scaur," "clan."

9. Explain, "lead but one measure," "ere her mother could bar."

10. What did Lochinvar do?

11. Give the chief events in the reign of Alfred the Great.

12. For what were the following persons remarkable:—Prince Arthur, John Baliol, Thomas a Becket, Bede, Robert Bruce, Dunstan, Earl Godwin, Hereward, Stephen Langton, Llewelyn, Matilda, Simon de Montfort, Robert of Normandy, Walter Tyrrell, William Wallace?

13. Name the Tudor sovereigns with date of accession.

*Fourth Class Junior.*

*Readers may be used.*

The Battle of Hastings—Page 37.

1. What relation was Harold to Edward the Confessor? What relation was William of Normandy to Edward?

2. Define ambassadors, leagued together, helmet, reconciliation, carousing.

The Black Prince at Cressy—Page 107.

3. The Battle of Cressy. (a) Where was it fought? (b) Why was it fought? (c) How was it fought? (d) What was the result of it?

4. Who was the father of the Black Prince? What was his mother's name?

5. Sketch a map showing Cressy, Abbeville, Calais, River Somme, Rouen, Hastings, Normandy, Flanders.

6. Give the chief events in the reign of Edward I.

7. Name the sovereigns of the Norman Line, with date of accession.

*Third Class Senior.*

*Readers may be used.*

By Cool Siloam's Shady Rill—Page 187.

1. Where are (a) Siloam and (b) Sharon?

2. Why are children compared to lilies and roses?

3. Who was Regina'd Heber?

4. What other well-known hymns did he write?

The Root—Page 223.

5. Define germinate, miniature, fibrous, shoot, essential organs of vegetation, verdant, rootlets, symmetry, botanist.

6. Tell some of the acts of Samuel de Champlain. When did he come to Canada? When did he die? Where did he die?

7. What Indian tribes assisted the French in war? Which assisted the English?

8. Why were the following places so named:—(a) St. Lawrence, (b) Montreal, (c) Lachine, (d) Virginia, (e) Louisiana.

LITERATURE.

*Third Class Intermediate.*

*Readers may be used.*

Volcanoes—Page 119.

1. Locate Java, Iceland, Naples.

2. Where were Herculaneum and Pompeii?

3. Define "conical form," "craters," "emit smoke," "lava," "eruption," "appalling," "disasters."

The Inchcape Rock—Page 133.

4. In what county is Aberbrothock (or Arbroath)?

5. In what sea is the Inchcape Rock? Near the mouth of what river?

6. Why did Sir Ralph the Rover cut the bell from the Inchcape Rock?

7. Why did he wish afterwards that he had not done so?

8. What does "tide" mean in the last verse but one? What is its general meaning?

9. What lessons may be learned from this story?

10. Name some other poem by Robert Southey.

*Third Class Junior.*

*Readers may be used.*

Prince Arthur—Page 46.

1. Where are Westminster, Mirebeau, Normandy, Falaise, Rouen, Seine?

2. Why was Arthur's title better than John's?

3. Define nobility, tournament, John's accession, usurping King, stratagem, receiving intelligence, dungeons, ruffians, executioner.

4. What important city is on the River Seine?

Holland—Page 78.

5. Where is Holland? Give its boundaries.

6. How does Holland differ from Ontario in regard to (a) soil, (b) roads, (c) fences?

7. Define bewildering, ditches, canals, omnibuses, passengers, merchandisc, mystery.

#### GRAMMAR AND COMPOSITION.

*Fourth Class Senior.*

1. Analyze:—"When the head of the French attack had reached within forty yards, Wolfe gave the order, 'Fire.'"

2. Parse:—"But the gallant Frenchman, though ruined, was not dismayed."

3. Distinguish between Subordinate and Co-ordinate Conjunctions, and write short sentences to illustrate.

4. Write:—(a) A sentence with verb in active voice. (b) The same with verb in passive voice. (c) A compound sentence. (d) The same using a complex sentence. (e) A sentence using direct narration. (f) The same using indirect narration.

5. You buy goods worth \$50 from James Thompson, and give him your note for the amount, payable in three months, with interest at 6 per cent. per annum. Write out and sign the note properly.

*Fourth Class Junior.*

1. Define Adjective, Relative Pronoun,

Adverb, Transitive Verb, Preposition, and write a short sentence to illustrate each.

2. Correct the following:—(a) I seen him laying under the table. (b) Me and him have been to the concert last night. (c) Papers was sent to Fred and I. (d) Wanted a room for a single gentleman twelve feet long and six feet wide. (e) This lesson teaches us never, under no circumstances, to deceive nobody about nothing.

3. Analyze:—"I wish you good night, gentlemen," says the man, when he passes.

4. Parse:—"Then he flings his stake into the hedge, and goes back again."

5. Write sentences containing:—(a) "That" used as a relative pronoun. (b) "That" used as an adjective. (c) "That" used as a conjunction. (d) "That" used as a demonstrative pronoun. (e) A predicate nominative. (f) A predicate adjective.

*Third Class Senior.*

1. Parse:—"Two large apples were given to her by Henry."

2. Define and write sentences to illustrate:—(a) Plural Number. (b) Superlative Degree. (c) Proper Adjective. (d) Future Tense. (e) Second Person.

3. Divide into syllables and mark the accented syllable in:—Buttercups, dandelions, particularly, meditated.

4. Form into a sentence:—Alfred Tennyson is a poet, He was born at Somersby, Somersby is in Lincolnshire, Lincolnshire is in England, He was born in 1810, He was educated at Cambridge, He wrote "The Charge of the Light Brigade" in 1855, He wrote "Enoch Arden" in 1864, His father was rector of Somersby.

*Third Class Intermediate.*

1. Parse:—"They found the lions on a small hill covered with wood."

2. Define Gender, Pronoun, Conjunction.

3. Make lists of vowels and consonants in machinery, favorite, tempest, branches.

4. Write five sentences, each containing one of the following words:—(a) of, (b) off, (c) loose, (d) loss, (e) lost.

5. Write a short description of "the road to school."

*Third Class Junior.*

1. Tell what Part of Speech each word is in the following:—"All this gay company, with their servants and the fifty soldiers, made three hundred souls aboard the fair White Ship."

2. Divide into syllables:—America, rhinoceros, hippopotamus, frequently, apparently.

3. Write five sentences each containing one of the following words:—(a) piece (b) peace, (c) do, (d) dew, (e) due.

4. Write a short description of a school room.

ARITHMETIC.

*Fourth Class Senior.*

1. If a pound sterling be worth \$4.86 $\frac{3}{4}$ , find the value in dollars and cents of £8 10s. + £10 6s. 8d. + £16 17s. 6d. + £20 3s. 4d. + £32 1s. 1d.

2. What is the difference between a measure and a multiple? Find the G. C. M. of 1134, 1386 and 630; and the L. C. M. of 18, 24, 36 and 42.

3. Divide 125 $\frac{1}{2}$  acres of land among A, B and C, giving C 7 $\frac{1}{4}$  acres more than B, and B 12 $\frac{3}{4}$  acres more than A.

4. One train left Toronto at 3 p.m. at 28 miles an hour; a second train left at 5 p.m. at 36 miles an hour. When will the second train overtake the first?

5. Find the interest on \$225.40 for 16 months at 8 per cent. per annum.

6. Reduce seven-eighths of a pint to the fraction of seven-sixteenths of a gallon.

*Fourth Class Junior.*

1. How many acres in a farm one mile long by 128 rods wide?

2. The dividend is 74,198, the quotient is 2,005, and the remainder 13. What is the divisor?

3. Of what number is 7,589 both the divisor and quotient?

4. Bought apples at the rate of 10 for 14 cents, and sold them at the rate of 28 for 40 cents, thus gaining \$3.25. How many did I sell?

5. The sum of two numbers is 4928, their difference is 228. What are the numbers?

6. Find the cost of digging post-holes, 8 feet apart, around a square farm containing 160 acres, at 50 cents each.

*Third Class Senior.*

1. Add the following questions vertically and horizontally, and prove the work by adding the results:—

\$346.20	\$242.15	\$493.15
124.15	347.83	265.14
624.13	242.27	327.18
984.84	327.24	327.68
267.75	684.19	563.29

2. Multiply the sum of 86297 and 40025 by the difference between 789 and 69.

3. In how many days will a clock strike 5304 strokes?

4. A man has a pile of cordwood 76 ft. long, 6 ft. high, and 4 ft. wide. How many cords in it; and what is it worth at \$4.25 a cord?

5. How many inches in 7 miles, 7 rods?

6. Find the cost of

213 lbs. Butter at 22 cents.
102 " Cheese " 18 "
114 doz. Eggs " 15 "
232 qts. Milk " 5 "

*Third Class Intermediate.*

1. Add the following questions vertically and horizontally, and prove the work by adding the results:—

\$321.14	\$324.38	\$201.68
124.05	297.16	328.14
245.36	317.27	613.14
325.18	684.39	327.16
246.25	562.18	496.87

2. Find the cost of digging a ditch 86 rods long at 27 cents a yard.

3. 45690 lbs. of wheat at 85 cents a bushel.

4. How long a string will it take to go round a house 42 ft. long, and 36 ft. wide?

5. Find the cost of a pile of wood 68 ft. long, 4 ft. wide, and 6 ft. high at \$2.75 a cord.

6. Find the cost of

105 bus. Turnips at 30 cents.
113 " Beets " 45 "
114 " Parsnips " 62 "
215 " Onions " \$1.37 $\frac{1}{2}$

## Third Class Junior.

1. Add the following questions vertically and horizontally, and prove the work by adding the results :—

\$46.20	\$42.15	\$93.15
24.15	47.83	65.14
25.13	42.27	27.18
84.84	27.24	72.68
67.75	84.19	63.29

2. The sum of three numbers is 101050; the first is 9999; the second is 1010 more than the first. What is the third number?

3. Divide 318494428 by 8907.

4. From twenty millions, twenty thousand, and twenty, take one million, two hundred and twenty-four thousand, five hundred and sixty-seven.

5. Find the cost of

17 yds. Cotton at	8 cents per yd.
36 " Print " 9 "	" "
15 " Cloth " 95 "	" "
13 " Lining " 17 "	" "

EAST VICTORIA TEACHERS' ASSOCIATION.—The annual convention was held at Lindsay on Thursday and Friday, Feb. 10th and 11th. Dr. McLellan attended, and discussed Reading, Grammar, and Cultivation of the Language Faculty. He also delivered a public lecture on "Critics (educational) Criticised." Mr. Sam Hughes discussed Discipline. Dr. Herriman gave a lecture on Hygiene. Mr. Milner read a paper on the College of Preceptors. A deal of time was taken up in the discussion of this subject, after which, a resolution in favour of the general principles was carried. The attendance of teachers and others was very satisfactory.

MESSRS. Stahlschmidt & Co., Preston, Ont., have had the honour of receiving an order from Her Majesty Queen Victoria, for one of their "Office King Desks," which were exhibited by them at the recent Indian and Colonial Exhibition.

## CONTEMPORARY LITERATURE.

THE *Fountain* (York, Pa.) is an excellent little magazine for supplementary reading.

THE February *Atlantic* contains poems by John Greenleaf Whittier and James Russell Lowell.

THE Agassiz Association has issued the first number of its monthly magazine, *The Swiss Cross*, which promises to be a valuable addition to scientific literature for young people.

THE *Decorator and Furnisher* (New York), as its name indicates, occupies the field of interior decoration. It is profusely illustrated, and is evidently the work of those skilled in this department of art.

THE *Book-Buyer* is a pleasant companion, and gives in its "English Notes," "Newest Books" and extended reviews, a great deal of news about books. The February number contains some eleven engravings.

*Common School Education* is a new magazine, published by Dr. William Mowry of

Boston, intended to be supplementary to that excellent periodical, *Education*. It has already secured contributions from many able educational writers, and we have pleasure in wishing it success and long life.

THE *Living Age* (Littell & Co., Boston) has now entered upon its 172nd volume, and is indispensable to many busy people who have not time to read all the magazines and reviews, and who find here the best parts of periodical literature. A recent issue contains a Life of the late Lord Shaftesbury, as well as verse, stories, travel papers and scientific notes.

*Shakespeareana* for January is a good number. One of its chief features is the *School for Shakespeare*, which promises to be helpful to students, and as the play taken up just now is the *Merchant of Venice*, we doubt not that many of our readers will find it of special interest to them at present. Other departments are *The Drama*, *Open Court*, and *Shakespeare Societies*.

*Lippincott's Magazine* for February contains a complete novel, "A Self-Made Man," by Mrs. M. G. McClelland. Under the title of "A Day with the President," a newspaper writer gives an account of what a hard working man does with his time. The literary criticism in *Lippincott* is always well worth reading, and, with the other departments, helps to maintain the popular character of this favourite magazine. The new cover in which it appears is very pretty.

ANNUAL ANNOUNCEMENT OF THE ONTARIO COLLEGE OF PHARMACY, St. James Square, Toronto.

CLASSICS FOR CHILDREN. A Second Reader. Stickney. Boston: Ginn & Co.

LATINE REDDENDA. Exercises from the Beginner's Latine Book. Collar & Daniell. *Ibid.*

COURSES AND METHODS. By John T. Prince. pp. 344. 75 cts. *Ibid.*

A good handbook for teachers, treating of programmes of study, methods of teaching, school buildings, moral training, and school government, etc. The general tone of the book is excellent.

THE BARCAROLLE. By Caswell & Ryan. pp. 287. \$1.05. *Ibid.*

A collection of vocal music of a high order. About seventy songs are given, some of them new; while among the others are gems from the great masters.

A POCKET ATLAS OF THE WORLD. pp 191. 25 cts. Chicago: Rand, McNally & Co. A convenient hand-book for everybody.

PRESUMPTION OF BRAINS. By Supt. Marble, of Worcester, Mass. Boston: N. E. Pub. Co. pp. 15. 10 cts.

A clever essay on the "Methods" pursued by too many modern educators, viz.: "Methods adapted to idiots" and not to children with brains. How long will children have any brains if educated by such methods?

THE NATIONAL QUESTION-BOOK. By E. R. Shaw. New York: Kellogg & Co. pp. 354. \$1.50.

THE THEORY OF DOUBLE-ENTRY BOOK-KEEPING. By Chas. Gilpin, Jr. Philadelphia: Porter & Coates.

A concise statement of the principles of Double-Entry Book-keeping. The explanations are clear and examples are also given.

DUTTON'S ANALYTICAL BOOK-KEEPING CHART. By Chas. Dutton, Expert Accountant. New York: The Office Co. \$1.

This map of book-keeping exhibits, in a comprehensive way, the principles of the science of accounts.

A SHORT GEOGRAPHY OF THE BRITISH ISLES. By John Richard Green and Alice Stopford Green. London: Macmillan & Co.

The aim of the distinguished authors, "to set before him (the learner) a broad picture of these islands," has been as abundantly realized as it is happily conceivable. We find here no dreary deserts of names, signifying nothing, but a true picture. The book is very suitable for students in the upper forms of High Schools and Collegiate Institutes.

SHAKESPEARE'S TWELFTH NIGHT. pp. 109. 1s. 6d. London: Moffatt & Paige.

The notes appended to the present edition are conveniently classified and well-arranged, ample for a student's needs, while not too full. The mechanical execution is good.

MOFFATT'S DRAWING COPIES. Nos. 3 and 4. 2d. each. *Ibid.*

These books are among the best in the market. The examples are carefully graduated and well chosen, and the outlines bold and clear.

AN INTRODUCTION TO THE STUDY OF GEOMETRICAL CONIC SECTIONS. By J. Hamblin Smith, M.A. London: Rivingtons. pp. 166. 3s. 6d.

The high reputation of the author and the success of his other mathematical works,



will ensure a favourable reception for the present book, which consists of five chapters, the first of which is entitled Introductory Remarks, and the others, The Parabola, Orthogonal Projection, The Ellipse, and

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