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THE ONTARIO TEACHER:

A MONTHLY EDUCATIONAL JOURNAL.

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AUGUST, 1874.

No. 8.

FALLACIES IN OUR PUBLIC SCHOOLS.

The world is very much afflicted by fallacies. There is no department of labor or profession exempt. Politics and law, religion and science, all have their fallacies. In all of them there is something believed by the mass, which if not absolutely false, is as much a fallacy as if it were, and in all of them there is something put forward, either by design or through ignorance, belief in which exerts no inconsiderable influence upon society. Nor is the art of education or our Public Schools exempted from those fallacies, some of them existing in the mind of the teacher, others in his constituents, which often thwart the purpose of the true educator, and damage the intellectual development of the school.

1. It is still believed by many that he is the best teacher, who most thoroughly *crams* the mind of his pupils. To attempt to explode this fallacy is almost a work of supererogation, for although yet credited, it is only by those whose intellectual attainments are such as to place them outside the pale of conviction. To imagine that the thinking powers of any scholar could be

cultivated and drawn out by memorizing words and definitions is so manifestly absurd, as to call for very little criticism. *That* only can be called mental food, which becomes assimilated with the mind, and thus constitutes part of the mind itself. The food received into the stomach is not nourishing unless its constituent parts are changed into nerve and muscle and bone. If not so changed then it is not food in the true sense of the term. Nor do the words and definitions constitute any part of true education, unless changed into thought, and incorporated into the incorporeal structure of the mind itself. To believe then, that a crammed intellect is a cultivated intellect, would be as absurd as to suppose that a man was an athlete because he had a full stomach. The history of many of our gold medallists fully sustains this view. No doubt they were well crammed with class book lore; no doubt their lexicons were well thumbed, and that many a weary hour they toiled to fill the mental receptacle with words and phrases; but what of that? Their memory power taken away, and what was left?

Nothing. The idea acquired, if any were really acquired, did not in their case possess any procreative power. Like the volumes in their library, but not so faithfully, their minds contained so much unwritten thought, but like these volumes quite incapable of developing other thoughts. And yet how many believe that the student or scholar thus educated is truly educated. The fallacy is a serious one, but delightful to those who fail to recognize the true design of education.

2. As fallacy No. 2, let us mention the too common impression, that a teacher should invariably lift a scholar over all the difficulties encountered at school. We often hear it said, that Mr. So and So is a good teacher, because he exhibits everything so thoroughly to his class, and helps them so kindly out of all their difficulties. We have no objection to the teachers' explaining everything thoroughly to his class, nor do we object to his helping them *kindly* out of their difficulty, but we do object to the teacher doing this in any case when he can reasonably expect the lesson might be understood, or the difficulty overcome, without his assistance. There is no greater mistake can be committed by the teacher than that of constantly rushing to the rescue of his pupils, and doing for them what they should be trained to do for themselves. One of the great objects of education is to develop the habit of self-reliance—to give the scholar confidence in himself. How can this be done except by letting him find out his own strength and by training him to rely upon his own efforts? We have known scholars to pass through the greater part of the first arithmetic and scarce know simple division—the teacher having wrought for them all the difficult problems. They were **CARRIED** over the hard work, not trained to *walk* over it, and when they reached their journey's end they were neither invigorated nor delighted by the result. Besides the loss of time, there was

in this case a visible failure of individual effort, none of the scholar's own native power having been drawn out—none of his own energy called into exercise. Like the infant in its mother's arms, carried hither and thither, so he was carried from one exercise to another, and still an infant all the while. We would here most emphatically denounce this so-called education—a process which, if allowed to go on, will result in national demoralization. Any teaching that does not strengthen the native energy of the scholar—that does not give him back-bone and self-reliance is sadly and fatally defective. Canada wants educated men to be sure, but not educated men whose powers have been dwarfed at school. The men our schools should furnish for future citizenship should be men of pluck and determination—men who were strengthened on their chairs at school, for fighting the battle of life—men who were not afraid to grapple with ordinary, or even extraordinary difficulties, and either find a way to surmount them or make one. The teachers have the power in their hands, either to destroy this spirit of self-reliance or to draw it out. They can do much to give us courageous, manly and progressive citizens, or to give us a class deficient in purpose, vacillating, decrepid and weak.

3. That it is of no consequence sending children regularly to school. That this is a very general fallacy is evident from the report of the Chief Superintendent. In 1872 out of 454,662 children registered in our Public Schools, there were 51,075 who attended less than 20 days; 93,333 less than 50 days, and only 17,748, who attended over 200 days. The average attendance for that year in the Province, was only 188,701. Now what a lamentable state of affairs this exhibits, only about one-third of our school population really being educated. It is quite useless even to suppose that those who attended less than 50 days are receiving an education at all. So com-

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ing down to figures, we have at least 185,502 out of a school population of 495,756 who virtually receive no education at all, and why? Is it because we as a people do not value education? Not at all. What then? It must be because we believe that it is not necessary, in order to be educated, that our children attend school regularly. How many parents bring the teacher to task for not advancing their children, not at all thinking that the teacher only sees them once or twice a week? Yet these parents believe it is the teacher's fault, because such slight progress has been made, or because their Mary or James is still in the Third Reader.

We will not further enlarge on this subject. And why should we? Has not the world always been governed by fallacies and is it not delightful to allow society to nurture delusions? But delusions that impede the progress of mankind, that prevent the attainment of that goal towards which the

great and good have long bent their energies, we would like to protest against and if possible explode. We must advance. To stand still would be wrong. To retrograde would be unpardonable. Teachers! it is your work to sound the tocsin of true progress. Yours should be the excelsior cry of enlightenment. We look to you with bright hopes for the future. If you fail our best hopes fail, and for the trust betrayed, what shall be the penalty? History only can tell. But rest assured the country expects much at your hands. To you she has committed those on whom her future depends. What you make *them*, you make *her*. Are they intelligent, self-reliant and progressive? Then is she the same. No higher can she rise than the height to which you elevate her future citizens. The work is a grand one. Prove yourselves noble educators of a noble country, for no higher reward you can have, and no greater need you ask.

THE GLOOM AND THE GLORY.

A SKETCH FOR THE ENCOURAGEMENT OF FAITHFUL TEACHERS, BY AN OCCASIONAL CONTRIBUTOR.

CHAPTER I.

THE TOILING ONE.

"With a longing look in her weary eye
And a half-unconscious sigh,
She gazes out on the fresh green grass,
And the glorious azure sky."

It was a warm June evening. The scorching sun of a Canadian summer was just disappearing behind the horizon. The rosy milkmaid was out armed with her pails; the various animals who had panting sought a covert during the day had resumed their accustomed sprightliness; the gentle hum of the mingled rural sounds came floating agreeably on the soft evening breeze; and the nodding forest, clad in richest vestments,

seemed to be wafting the adoration of all nature to the great Creator.

And in her quiet little room, at this soothing hour, sat Jennie Faithful the teacher of the section. Neat and tidy in appearance, of good figure and intelligent face, the most casual observer could not but detect a shade of care on her handsome countenance. She had now been nearly six months teaching the Mud Valley school, one of the largest in the District. The average attendance had been over seventy, and the pupils were of all grades, from the A-B-C class to the highest form of our Public Schools. The school house was scarcely large enough to accommodate fifty pupils com-

fortably. The people of the section were kind-hearted, but many of them lacked intelligence. Despite all these difficulties, Jennie had worked on earnestly, faithfully, perseveringly, and won success to a degree previously unknown in Mud Valley. There were exceptions, it is true, but on the whole the children were very much attached to her, and the parents generally well satisfied.

It had been an unusually trying day. The school was very large, the weather intensely hot, and Jennie's kind and patient firmness was tried to the utmost. When the school was dismissed at 4 o'clock she was utterly exhausted. It was not the exhaustion of simple fatigue, which finds its remedy in rest; it was that peculiar nervous exhaustion so well-known to teachers, which for a time refuses solace from either reading, rest, conversation, or recreation. It was now getting dusk, and Jennie's overtasked system had become so far soothed that she was able once more to think connectedly. Almost unconsciously she settled down into half-pleasing, half-painful meditation.

And what was the subject of Jennie's thoughts? Was she longing anxiously, and even fretfully, as many time serving teachers do, for the vacation now near at hand, when she could bid farewell for a season to the toils and trials of the school-room? Nothing of the kind. Or was she looking forward to the happy time, now approaching, when she would have a joyful meeting with dear friends, from whom she had for months been parted? This would be natural and proper, but even this was far from her thoughts. What was it?

Jennie's mind went back over the days, weeks, and months she had spent in Mud Valley. She seemed to herself to be painting on the tablet of memory, a panoramic view of the 'last six months' history—an autobiography of her school experience. And along with it came a deep consciousness of the awful responsibility of the teacher's vocation, and the far reaching conse-

quences of the impressions she had made, and the influence she had exerted. There was much that was pleasing, many beaming and grateful faces seemed to throng the vista of the past; but there were also unsatisfactory features. She looked back over the last day and the last week, and her expressive eyes closed for a moment with a feeling of anguish.

She thought of one of the boys in her school whose good feelings she had tried to reach by every possible means, but in vain. He was evidently possessed of a powerful intellect and noble nature, but wild, insolent, refractory, she had finally been compelled to invoke the aid of the Trustees to expel him from the school. Her unwearied kindness and good instructions had seemingly produced no fruit in the wilderness of his moral nature. She thought of another, a boy of good disposition, but who was dull in intellect, and whose parents had severely censured her for his lack of improvement. Only two days before a bright little eight year old girl had been laid upon a sick-bed, and Jennie was blamed for urging her to study beyond her powers of endurance. One after another her pupils passed in review before her mental vision, and as she recalled the peculiarities of each, her mortifying failure in many instances, the bad habits still unbroken, the dislike to study, still unobliterated, the inherent viciousness yet seemingly scarcely restrained, she gave vent to a half suppressed sigh, which might have swelled to a wail of anguish, were it not that even in this hour of depression Jennie could see that the cloud had a silver lining—that the dark picture had a brighter and more beautiful side.

Then she reflected on the unreasonable-ness of some of the parents. Mr. A. had positively refused to provide the necessary books for his children, asserting with all the solemnity and assurance of a deacon, "there warn't no airtly use in them new fangled notions, readin' and writin' and

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sipherin' is all the larnin' any farmer's son wants to git." Mr. B. visited the school last week in a high state of virtuous indignation because his son had been detained half-an-hour after school to get up some neglected lessons; he couldn't "stand no such nonsense, and wanted his Jim home right after school to help to pick off potato bugs." Mrs. C. thought her girls had made such remarkably slow progress, forgetting or overlooking entirely the important fact that they had attended not more than two days in the week. Mr. D. had confronted her—nearly bursting with astonishment that so many books and slates were destroyed or lost in school, forgetting entirely that poor Jennie had no place in which any of the school requisites could be kept. All these things and many more passed in review before her imagination.

The shades of evening were gathering thicker and heavier, but afar above in the depth of space the grand concave was becoming studded with stars. The air was becoming cool and pleasant; the swell of music from the rosy country lass, and the robust farmer boy mingled with the whippoorwill's note, diffused a hallowing influence; but all these so far from comforting Jennie, only seemed to add to the agitation of her troubled mind. "After all" she thought, "have I not made a mistake? Am I really qualified for the position I occupy? Do I understand aright the nature of the mind that 'deathless thing,' which I am trying to mould and fashion day by day? My trials seem greater than I can bear. I seem to myself to have done the best in my power, but alas! I am met with trouble and disappointment. What shall I do? Surely there is no need of following a vocation which impairs my health, racks my brain, destroys my tranquility, and brings so small a harvest of joyful results to cheer me on the way. I may thus work on unknown and unnoticed; if I succeed I will have little hope of rising higher, of ever winning dis-

inction or placing my name among the famous or the great; if I fail it will be equivalent to a sentence of unfitness for any position whatever—'Tis all very well for theorists and orators who never taught school a day in their lives to talk of its rewards; let them try it and see. For my own part I am discouraged, weary and sad. The work seems too great for my feeble powers. My success is not what I could wish. Have I tried? Yes, I have tried earnestly, but what avails it? To-day my school was in disorder, my boys and girls unruly, some parents unreasonable, others dissatisfied. O merciful Father! visit me with thy goodness and guidance in this trying hour, and guide me safely through all dangers and perils of this life!"

CHAPTER II.

THE REWARD.

"But courage, weary toiling one!
Thy field of work is wide;
And though thy labor may be great,
There is a brighter side."

The gradually fading twilight had deepened into the shades of night. The glorious stars shone out on the brow of evening, like ornaments on the skirts of the robe of Deity. The silver moon was just about arising to shed her soothing light on a world cooled, and calmed, and tranquilized, after the sweltering heat of the day. The landscape was hushed, except when now and then the hooting of the owl sounded from the distant forest, or the merry laughter of romping boys and girls, broke through the still night air. The cooled earth, the brilliant heavens, the refreshing night breeze seemed to have obliterated from the face of nature and the memory of the animate creation, all traces of the scorching atmosphere of a few hours before, and a drowsy delicious stillness settled over the rural scene.

And where was Jennie? She still sat in the same chair, and in the same room, but her eyes were closed in peaceful slumber.

Quieter, gentler thoughts had gradually stolen over her wearied and harrassed spirit, and in answer to fervent prayer, a feeling of greater contentment and serenity had spread over her soul. In the midst of her slumber a light shone over her countenance, visible even in the darkness of her room, and to her mental vision opened out a wide panorama of diversified objects, and untold grandeur.

It seemed to her as if she was near the lower part of a wide and deep vale, over which rested a subdued light, partly gloomy, and partly soft and tranquil. Away in the rear, and lower down in the valley, rested thick and impenetrable mists, the influence of which extended even to the place where she was standing. In front of her to the east the ground rose gradually as far as the eye could reach. On the right hand side traces of sunlight could be seen far up the distant steps of the declivity, while on the left side, the mists and clouds extended upwards like an impregnable rampart, forbidding any attempt to explore their secrets. As Jennie stood amazed and perplexed, she suddenly saw an angelic form approaching, and was seized with fear and trembling.

"Fear not" said the celestial visitor, "I am thy guardian angel. I have heard thee disconsolate, mourning thy lack of success. I know thy troubles, thy sincerity, thy earnestness. The Great King whose servant I am, and whose service is the highest honor and the greatest freedom, will not the misery of any of his creatures. He is gracious, and full of compassion, and merciful. I come on purpose to cheer thy drooping spirit, to give thee higher conceptions of the teacher's work, to point out the rewards of the faithful teacher."

She took the angel's offered hand, when all at once her eyes seemed to be opened, and the whole plane was revealed to her gaze. The objects spread out before her

were so many and strange, and the whole scene so vast and diversified, that it might well inspire terror. But fear had departed, and she not only felt reassured, and cheered by the angel's gentle voice, but through her whole spiritual being spread a boundless confidence in her heavenly Father's love. But though not afraid her spirit went forth in eager inquiry. "Tell me" she said "my kind guardian what does all this mean?"

"This vast inclined plane" said the angel, "now spread out before thee, is the Plane of Being. Afar in the rear it is covered with mists which hide from mortal ken the origin of existence. On the right hand is the way of progress to excellence, usefulness, virtue and immortality. Away up the sublime slopes of yonder declivity toil the favored portion of the human family, and as they rise upwards, attain to loftier degrees of mental and moral elevation, and approach nearer the blazing summit lost to view in the very brilliance of its glory."

"But" said Jennie "what mean those thick clouds, so dark, so heavy, so frightful, on the left?"

"I am not" replied the angel, "sent to rack thy gentle sensibilities by unfolding their secrets; suffice it to say that under their gloomy veil, representing the perpetual reign of Ignorance and Selfishness, lies the region of Error and Sin. There wretched mortals who have forsaken truth and right, are travelling downwards to lower and sadder deeps of degradation and sensuality. There many a faithless slothful teacher finds a dwelling place; there badly educated boys and girls, are being trained for a life of misery and shame; there a blasted withered company of men and women are travelling ruthlessly downward to a yet more terrible place—the dark bottomless Gulf of Perdition. But let us not dwell on this picture; something far more pleasing must engage thy thoughts."

Taking the hand of her guide Jennie sped on with great rapidity, and suddenly found

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herself standing by a school-house the exact counterpart of her own. There were all her scholars, and she seemed to herself in their midst laboriously striving to train aright their tender minds. While she seemed conscious of no loss of identity, she was equally conscious that the gentle, earnest, industrious girl, who was working among eighty boys and girls, was no other than Jennie Faithful. There were the pupils who had so often given her trouble; there were the many bright and smiling faces which cheered her in her labors. And spread around in the distance were the farm houses where resided her many warm friends, as well as unjust and prejudiced enemies.

After contemplating this scene for some time in silence, her guide again took her hand, and with great velocity she soon found herself in another scene, apparently at an immense distance. She saw scattered around her former pupils now grown to be men and women. Her vision, strengthened supernaturally, could behold them in the various walks and vocations in life. A few of them alas! were nearing the dark clouds on the left, drawn thither by some infernal influence. That boy whose reckless impetuosity had often distracted her, was standing on a platform addressing a large audience, and was advocating eloquently the educational and philanthropic projects so intimately connected with human happiness. Cheer after cheer rose from the multitude, as he poured out his impassioned oratory; and when at last he sat down it seemed as if "an angel had spoken." An old man rose to propose a vote of thanks, and in doing so dwelt on the shining virtues, the brilliant talents, the great usefulness, and the Christian generosity and philanthropy of the speaker. After this was carried amid thunders of applause, he sprang to his feet and said in a voice husky with emotion, "Gentleman while desiring gracefully to acknowledge the compliment

you have paid me, I would say that your gratitude should rest upon another and worthier object. I was once a wild and wayward boy, ripe for a career of ruin and shame. What saved me from such a fate? A gentle, faithful teacher. If I have ever been of any use in the world—if I have ever aided any good cause, or assisted my fellow creatures in approaching nearer your brilliant summit, I owe it under God, to the tender care, the persevering training, the wise instruction, and above all the good example of Jennie Faithful. May heaven's richest blessings ever rest on the head of my first and truest friend!"

His words had hardly died away when a little further to the right, rose up a costly and beautiful school-house with its grounds in perfect order. In the room was one of the very girls that had attended Jennie's school, —one of the wildest and most refractory—now grown to mature age. Everything seemed to go on with the regularity of clock work, and when the school was dismissed, and departed to their respective homes, she fell on her knees, and as her sweet accents of praise and prayer swelled out, among other expressions of gratitude she thanked the great Creator that she had in her younger days been under the care of a teacher so kind, so true, and so earnest, as Jennie Faithful. Still further to the right she saw a lady ministering to the wants and sorrows of the poor and distressed, and she too, seemed never weary of sounding the praises of her old teacher. A minister of the Gospel was taking his way among fallen humanity, and as he walked he spoke and encouraged others to usefulness by the example of his old teacher, Jennie Faithful. Going a little further she recognized in the most distinguished artist of the age, the very boy who was so dull that he had been pronounced a dunce—as he transferred to the canvass those brilliant creations of genius, which woke the wonder and admiration of the world. Sitting

in his studio she recognized in him the stupid inactive boy whom she was even at that time vainly striving to incite to an industrious application to study. A stranger—an artist came along, and after some friendly conversation asked him the secret of his success—"I trace it all," he replied, "to the kind and earnest instructions of the teacher of my youth, Jennie Faithful. When all others passed me by as a dunce her gentle voice, her tender encouragement, her unselfish devotion to my good, roused up my dormant energies, and made me determined to be worthy her esteem. I became fired with an unconquerable resolution to develop my latent powers. I was thus enabled to discover and cultivate the talent which God had given me, and I am here to day a living practical illustration of the grand results that may be accomplished by the unassuming labors of one faithful teacher."

After witnessing many more such cheering scenes, Jennie again took the hand of her Guide, when suddenly the whole was changed. On an eminence, at a little distance, stood the Jennie Faithful of coming years, now in the mellow light of a serene old age. Around her toiling earnestly up the steep ascent was a multitude of men and women—"Look" said the angel, "at the results of thy labors! The influences exerted in the school-room have been sweeping onward for the last half century, like ceaseless ripples on the great ocean of humanity; they have been going on from one mind to another, reclaiming the erring, stimulating the slothful, turning all in the direction of their greatest good and highest happiness. Behold thy reward! These good influences cannot die; they will go on blessing and benefiting mankind, not only through time's transitory limits, but through the breadth of immensity—the length of eternity."

Jennie listened and looked until the old woman before her had departed from earth, amid tears such as only the sincerest

gratitude and affection could produce. Then again taking the hand of her guide they rose to a dizzy height above the Plane of Being, and watched till a terrible conflagration overspread its entire area. A multitude of human beings had gone far beyond its reach, near the glorious and blazing summit. "See," said the angel "the vanity of earthly pomp and fame. The mightiest monuments of human skill have crumbled into dust; the warriors whose transcendent genius startled and amazed the nations, and who waded through a sea of blood to the throne of his ambition, has sunk into the shades of everlasting night; the solid marble designed to perpetuate his memory, bears no traces of his name. But the faithful teacher who has written lessons of truth and virtue on the human soul, will be held in everlasting remembrance; the seeds planted there will continue to grow and blossom, and bear fruit, and extend and increase, coeval with its existence, and be an imperishable monument to her praise and glory—"The name of the just is blessed, but the memory of the wicked shall rot" Thinkest thou the teacher's work insignificant? Behold the reward of the faithful!"

All at once near the flaming height beyond, the light shone brighter, and stretched across appeared a scroll on which were traced many names in characters of light. "See" said the angel, "Heaven's Honor Roll! How different from man's Scroll of Fame! That bears the names of bad and good alike; this only those to whom Heaven's King has granted a certificate of character. That has already perished in the general conflagration; this will be exhibited forever and ever, in all its glory and beauty to the gaze of an admiring universe. That has only the names of the mighty and great; this of all however humble, unassuming or unknown, who are accounted worthy."

Jennie gazed at the long list of heroes, martyrs, teachers, and others, and at last

discovered with joy and wonder, that her own name was there. And from the bright glory around came the words, sweet and clear, filling her soul with such rapture that when she awoke they still seemed to be sounding in her ears : "They that be wise shall shine as the brightness of the firmament, and they that turn many to righteousness as the stars for ever and ever."

"FEED MY LAMBS."

John 21: 15.

BY L. LAWSON.

"Feed my Lambs," the Saviour said,
Give to each its daily bread ;
Entering on life's toilsome way,
Feed the children every day.

Young and tender, strength they want,
Lest they on their journey faint ;
Help them, then, along the way,
Feed the children every day.

Who these tender lambs shall feed ?
Who shall give them what they need ?
Who their pressing wants supply ?
Who their longings satisfy ?

All may lend a helping hand,
All may feed the hungry band ;
All may share in doing good,
All may give the children food.

Who would then the work disdain ?
Who from doing good refrain ?
Who would not with willing heart
In such labor take a part ?

Fellow-Teachers, through the land,
Trainers of the youthful band,
Never let your zeal abate,
Laboring in a cause so great.

Give the children daily food,
Give them *only what is good* ;
Feed the HEART as well as head,
Give them spiritual bread.

Give them intellectual lore,
Give them this—and something more—
Teach them how to *live* and *die*,
Train them for a home on high.

ENGLISH HISTORY IN OUR SCHOOLS.

BY FRITH JEFFERS, SECOND MASTER, PICTON HIGH SCHOOL.

The word *English* in its connection here must be understood to be equivalent to *British*, as including the history of the three nationalities, whose union has raised the kingdom of Great Britain and Ireland to its present fame, and prestige in the world. While the word *Schools* may be taken to include our higher schools and colleges, although having special reference to our Public Schools, to whose interests this magazine is more particularly devoted.

The study of History has from the earliest times been considered of the greatest importance. The most careless peruser of it cannot but notice the reverence paid to tradition, in ancient times; while the estimation in which the old records were held, sufficiently indicates the innate desire of the mind for a knowledge of the past. Cicero calls history—"The light of truth." The elegant Rollin affirmed, "It is not without reason that history has always been considered as the light of ages, the depository of events, the faithful evidence of truth, the source of prudence and good counsel, and the rule of conduct and manners." Bacon considered it the "chief component part of learning," and philosophy and poetry a subordinate place to it. While it has long been a common saying that "History is philosophy teaching by examples." At the present day, the honors paid to Lord Macaulay show that a very high opinion of history as a study continues to exist, and that the highest awards still await those who diligently pursue it.

And though we would not disparage the study of General or Universal History, yet we would affirm that nothing can be more profitable for the English student than the

study of the history of his own Empire, *primarily and attentively*. For it includes the ancient and barbarous history of Europe in the far past, and during the Christian era has been more international in its character than that of any other country of the old world. At the present time, so numerous are the connections of England through war, treaty, and commerce, with every quarter of the world, that her history to day, is that of the manners, laws, products, and commercial worth of the nations with which she has anything to do. And this is the more evident as we consider her greatness.—Upon the circle of her empire the sun never sets. She holds possession of all the capes, and promontories of any value,—and keeps the keys to the entrance of the principal seas. Her colonies are in every part of the Globe. She is the mother of the greatest nation of the New World. In one word, her influence is felt, in every corner of the earth.

But though England's influence is great internationally, and her general history of consequent importance, it is upon Canada of all her colonies, that her greatest and chief influence is felt.—Settled, as regarded the politics of the old country, under more favorable circumstances than the United States, Canada has preserved her loyalty untarnished. While our laws founded upon those of England, and constantly referring to them for precedent, or appealing to them in decision, are laying for us the foundation of a great nation—drawing us more closely, and binding us more firmly to the great centre of the Empire of which we are proud to form a part. Our communication with the old country, by our line of rapid steamers, and submarine cable, cause us to feel

almost instantaneously her influence, or to sympathize at once with any change of politics, trade, or religion that affects her. Great Britain is the mother of our nationality, the author of our laws, the champion of our religious freedom. Why should not we as a young nation become, as it were, acquainted with the history of our own family, and go for lessons of wisdom and prudence to the experience of our parent.

The study of British history is therefore necessary to proper sentiments of loyalty. Loyalty is not a blind fanaticism, revelling in ignorance. It is intelligent—the personification of that sympathizing, forbearing, and self-sacrificing love of country and nationality, which has ever animated the truly great. We will find in the history of every nation, noble, grand examples of Love of Country, exhibited by eminent deeds of valor. But in no other nation, has there ever been such earnest contest, yea, almost bitter strife for the principles of true liberty; between opposing factions and parties,—succeeded by such united and unswerving loyalty in time of national danger, as in the British Islands.

With a kindred sentiment, and with equal boldness has our Protestantism been built up, and sealed with the blood of courageous and self-denying men; while in feeling like to religious loyalty, if we may so call it, the British nation has since borne allegiance to it. May she ever do so, and with her colonies, continue to be not only an adherent to, but the protectress of religious liberty throughout the world.

Not only is English History necessary to us, that we may rightly understand our own past, and fully appreciate the course of present events in Canada; but is a great assistant to us in the study and use of the English language. Our daily conversation reminds us of this fact. For instance, in speaking of any of the sects religious or otherwise, by which English society has been disturbed, the very name will in its

derivation tell us of some circumstance regarding the origin or esteem of such sect, or of the state of public opinion at its rise. The name of the different articles of commerce will often suggest to us some important or interesting fact in the trade of England. While several other classes of words refer us to the effects of the invasion and occupation of Britain by various races, or to the time of revolutions which have either left their mark upon the history of the country, or tell the fate of some madman's attempt to disturb society and the country. Looking thus at the connection of British History with our laws, politics, religion and language, we perceive at once its importance in an English polite, or professional education, and the relatively distinguished place it should occupy in the curricula of our colleges and higher schools.

But here the question proposes itself: Is due prominence given to this study in our Public Schools—the nurseries of our colleges, in fact the only college the majority of our people have the opportunity of attending?

Many readers of the TEACHER can doubtless remember when the merest elements of a primary education were all the scholarship that the Public School afforded, and when time was esteemed as good as wasted, if employed upon anything not immediately relating to the acquisition of the old Halifax currency, and indeed, it is only comparatively lately that any considerable prominence has been given to the study of English history in these schools. For, although it was distinctly mentioned in the programme of studies for "Common Schools," as presented by the Council of Public Instruction, yet the want of proper text-books, together with a limited or irregular attendance of pupils, as well as other and even insignificant reasons were allowed to militate against every consideration in favor of a worthy knowledge of this eminent branch of a sound education, being acquired.

in these schools. But *now* our text-books being changed, the reading-books we are obliged to use in our duties abound in historical sketches and narratives—principally taken from British history. While using these books in the class-questions or slate exercises upon a lesson we cannot avoid making allusions to such history, or giving our pupils some information. But is this the full extent of our duty, or are we not rather obliged—not only to impress the facts of these lessons upon the memory of the young pupils, but also by means of them, to beget an intelligent wish for more of this knowledge, and to satisfy this desire, by the employment of the best means at our disposal.

As we already mentioned our Public Schools, with whatever advantages they may afford, are the only means which the majority of the people possess for acquiring a preparation for the duties of life. There is no reason why they should not furnish this preparation, and we think a considerate reflection upon the importance of English History in a Public School education, will suggest to every zealous teacher various hints as to the method by which he may give his pupils the full benefit of his labors, and thereby do his duty and give honor to himself. It would almost seem that a recognition of the necessary place, which history in its relation to other studies should occupy in a sound English training—furnished the system—upon which our school books have lately been altered. This relation is most evident when we attempt to satisfy our curiosity with regard to the

derivation of a word—compare the different changes in our orthography—refer to any of the inflections of etymology, or employ any denomination of Arithmetic or Book-keeping, without at the same time, either directly or indirectly referring to the history of the nation whose language we speak.

The objection of the youth of the pupils does not hold good. The young mind is very susceptible of being impressed, and eagerly grasps anything new or strange to it; especially is there a desire for narrative and adventure, and if we do not supply this mental appetite with proper food, or direct this inquisitiveness in the proper channel, it will waste itself upon froth and fiction, and either prove the destruction of the mind or render null its capability for anything great, good, or useful. The teacher may make history the object of his pupils' curiosity, and convince them that "Truth is stranger than fiction." There is no time like youth to make life impressions—or to prepare the man for the future, by comparing the present with the past. The world and Young Canada require practical men. The age is past for merely learned drones, who

"From the loopholes of retreat,
Look upon the world
Hear the sound of the great Babel,
And not feel its stir."

As Putnam says:—"Society has work for us, and we must go forth to do it. Full early and hastily we must gird on the manly gown, gather up the loose leaves, and scanty fragments of our youthful love, and go out among men to act with them and for them."

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RECITATIONS.

BY GEO. B. ELLIOTT, OTTAWA.

A good deal has been said in educational periodicals, upon the best methods of teaching the various branches of public school instruction. This, I am happy to perceive, forms a very useful feature in the Ontario TEACHER, and I trust it may continue to engage the attention of the practical educators of the Province. But leaving this to more skillful pens, I shall offer a few reflections upon the general subject of conducting recitations.

I think as teachers, we adhere too closely to the text-book in *hearing* recitations. The book is absolutely indispensable to our teaching at all, and is final in its authority. It embodies all that can be communicated upon a subject. Had it been given by Divine inspiration, we could scarcely receive it with more unquestioning faith. I verily believe that much mischief arises from this practice. The errors, inaccuracies and loose statements of the books—and none are wholly free from such—glide into the pupil's mind, and take as tenacious a hold of his memory as what is true and accurate. The teacher, too, loses his individuality and with it most of his efficiency in teaching. He is a mere appendage to the book—of little more practical utility to the learner, than the questions which cumber the pages. Whatever may be the cause of this dependence upon the letter of the books, whether it be a lack of knowledge of what we attempt to teach, or of zeal and self-respect, which would impel us to devise original methods and note the statements of others tributary to our own—whatever be the cause, I repeat, the result is the same, the teaching is not vital.

Almost every teacher employed in the Prussian schools, is capable of preparing the text-books used in his school. In

fact, in the larger schools, very many of the teachers *do* thus prepare their own books. Their professional knowledge is thorough and exhaustive. How few of *our* teachers are competent, intelligently to compile from the abundant material around them, a primer or spelling-book for a primary school? How few are able to give a sound discriminating and critical opinion upon the merits and defects of the books used by their pupils? I fear, if we could get a truthful answer to these questions from book publishers and agents, there might be just grounds for self-reproach and humiliation.

To every recitation, the teacher must bring certain positive qualifications, and during it he must be in a certain state of mind, and perform certain important functions; otherwise he does not *conduct* the recitation, the recitation *conducts* or *does not conduct* itself.

I will briefly mention a few of the principal things which I deem essential to success in this particular.

1st. The teacher should possess a clear, accurate and comprehensive acquaintance with what he undertakes to teach. In his mind the subject should have the certainty of science. Confused notions are fatal to progress. He should know very much more than the mere specialty upon which he is called to teach. He should be able as occasion requires to draw from language, from mathematics, from natural science, from literature, from art, from nature,—facts, arguments, and illustrations to freshen what is stale, light up what is dark, and to bid the dry bones of the text-books be clothed upon with a beautiful garment, and infused with a living spirit.

2nd. His mind must be wholly given up to the matter in hand, while conducting the

recitation. He must be cool, free from embarrassment and distraction, yet earnest and useful. He must have as it were, an intellectual hold upon his class, and establish an intimate sympathy with it.

Horace Mann, I think it is, who describes a visit he made to a school in a remote mountain region in Scotland. He found the teacher with his coat off, in front of the class, laboring intellectually and even physically, as if his very life depended upon his earnestness. His eyes flashed the genuine soul fire; his words came clear, quick and resonant; his arms swung, his body swayed. He was working, and every power of mind and body was enlisted in the service. And then the intense interest and activity of the pupils attested the vitality of the instruction; the little boys and girls were in such a state of mental excitement as fairly to leap off their seats when a question was put to them. Now, I may not counsel the taking off of coats, or violent physical labor; but do think that this great energy of mind, this wakefulness of the mental faculties, are necessary conditions, on the part of teacher and taught, to the proper communication and acquisition of knowledge. The mind grows only by its own intense action. The pressure must be within the brain and not upon it; the one is life, the other death. A sleepy, stupid, absent-minded teacher, pretending to hear a recitation from a droning half-awake class, is a most lamentable burlesque upon the noble business of instruction.

3rd. As to what the teacher must do—

while conducting a recitation. He must be careful not to do too much—not to do a single thing the class can do. It is never his business to recite a lesson. When there is a difficulty he ought simply to indicate the way in which it ought to be removed, instead of removing it himself. If, at any time, he does attempt to remove an obstruction, or clear up what is dark, his efforts must be an *entire* success or they will be, so far as his pupils are concerned, an entire failure. Every line he makes upon the mind, must be deep, sharp and direct. He must not only strike at the mark, but to the mark. He must throw the scholar wholly upon his own resources. The progress and the movement must be made by the class, the teacher sustaining simply the relation of director. He must question and cross-question, with the pertinacity of a despairing lawyer. He ought to show the open and the hidden uses of what he teaches, and impart some power to apply abstract knowledge to life and soul purposes. He should enkindle or establish in the young heart a love for knowledge, and an unslumbering zeal in its pursuit. He should throw around his own labors, and his pupils' efforts and attainments, the sacred glow of reverence for truth. In fine, by every exercise of the class-room, he should lead his scholars up that shining ascent, where every step some fact of science is, to *Him* who is the perfect knowledge, and the perfect truth and, the refined mind to *Him* who is the beginning, sum, and consummation of all things.

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SOLUTIONS TO QUESTIONS,

AT THE RECENT EXAMINATION FOR TEACHERS' CERTIFICATES, AT THE CLOSE OF 51ST SESSION OF THE PROVINCIAL NORMAL SCHOOL. BY J. C. GLASHAN, ESQ., INSPECTOR, WEST MIDDLESEX.

NATURAL PHILOSOPHY—FIRST CLASS.
TIME THREE HOURS.

1. The principle of the Parallelogram of Forces being assumed to have been established so far as the *direction* of the Resultant of two forces is concerned, prove that it is true as regards the *magnitude* of the Resultant.

Book work.

(The Parallelogram of Forces is only another form of Newton's Second Law of motion.)

2. The distance of E, a point on a square surface ABCD, from the side AD, is 2 feet; and its distance from AB, is $1\frac{2}{3}$ feet; the side of the square being 5ft. Prove that a particle at E will be kept at rest by four forces acting in the directions EA, EB, EC, ED, respectively, if these forces be represented in magnitude by lines equal to EA, $\frac{1}{3}$ EB, $\frac{1}{3}$ EC, and $\frac{1}{3}$ ED, respectively.

(Mechanical Principle:—The Triangle of Forces.)

Through E draw a line parallel to AB, cutting AD in F and BC in G.

$$EF = 2\text{ft. } \therefore EG = 3\text{ft.}$$

$$FA = GB = 1\frac{2}{3}, \quad FD = GC = 3\frac{1}{3}.$$

Let *i* represent a force acting parallel to AB in the direction A to B and in magnitude represented by a line a foot long. Let *-i* represent such a force acting in the direction B to A, *j* such a force acting perpendicular to AB, in the direction A to D, and *-j* if it act from D to A. Using Italic letters to represent forces,

$$EA = EF + FA = -2i - 1.4j$$

$$\frac{1}{3}EB = \frac{1}{3}EG + \frac{1}{3}GB = 1.5i - .7j$$

$$\frac{1}{3}EC = \frac{1}{3}EG + \frac{1}{3}GC = 1i + 1.2j$$

$$\frac{1}{3}ED = \frac{1}{3}EF + \frac{1}{3}FD = -.5i + .9j$$

$$\therefore EA + \frac{1}{3}EB + \frac{1}{3}EC + \frac{1}{3}ED = 0i + 0j$$

But the dexter side is simply the analytical expression of the condition of equilibrium which consequently the sinister side satisfies.

3. A uniform heavy beam AC rests with one extremity C on a (vertical) wall DB; and the other extremity on the ground at A; ABD being in a vertical plane. Show that if AB = BC, the friction at A and the friction at C are together equal to half the weight of the beam.

(Mechanical Principles;—Any force may be resolved into a system of forces and a couple. The effect of a couple is not altered if its arm be turned through any angle about one extremity in the plane of the couple.)

Bisect AC in G which will be the point of application of the weight of the beam, equals 2w say.

Let 2w;G mean a force = 2w applied at G and acting directly downwards and 2w;j;G a force equal 2w applied at G and acting horizontally from G towards BD.

The weight of the beam produces a force 2w;G which may be resolved into

$$(2-r)w;A + rw;C - (1-r)w;j;A + (1-r)w;j;C.$$

Now the first and last of these are balanced by the resistances of the planes and the second and third by friction. The absolute sum of these latter neglecting their 'direction of action' is

$$rw + (1-r)w = w = \frac{1}{2} \text{ of } 2w.$$

To find limits for r, let m and n be the respective coefficients of friction of the earth and wall

$$\frac{1-r}{2-r} \text{ is not } > m \therefore r \text{ is not } < \frac{1-2m}{1-m}$$

$$\frac{r}{1-r} \text{ is not } > n \therefore r \text{ is not } > \frac{1}{1+n}$$

(For the sake of those of our readers not practised in resolution we give the following series of steps which are easy to follow if the figure be drawn.

$$2w;G = w;A \div w;C = \{ (2-r)w;A - (1-r)w;A \} + \{ rw;C + (1-r)w;C \} = \{ (2-r)w;A + rw;C \} - \{ (1-r)w;A - (1-r)w;C \}$$

(The latter part is a couple, rotate its axis through a right angle about the extremity A).

$$= \{ (2-r)w;A + rw;C \} - \{ (1-r)w;j;A - (1-r)w;j;C \}$$

For a geometrical analysis of this problem see "Jellet's Theory of Friction" Chap. II. Sect. 4.

4. A body, when left to itself on a rough inclined plane, is just on the point of slipping. Show that the inclination of the plane to the horizon being 30 degrees, it would be as easy to lift the body as to drag it up the plane.

Since the body is on the point of slipping the angle of repose is 30 degrees and \therefore the angle of minimum P is 60 degrees; *i.e.*, 30 degrees above the plane, and also 30 degrees from the vertical, hence the truth of the proposition.

Or thus, since $Pl = Wh$,

$$\begin{aligned} (p + mw) l &= wh \\ (p' - mw) l &= wh \end{aligned}$$

But by the problem p equals 0 and l may be proved $= 2h \therefore p' = w$.

(Evidently "easy" refers to *force* not *work*, and "drag up," means that p shall act parallel to the plane. However, since dynamical friction is less than statical friction, the dragging once commenced will be easier than the lifting. In fact, since "drag" implies motion the problem is not true. See "Jellet" page 9.)

5. A stone begins to fall from A, under the force of gravity at the earth's surface; and n seconds afterwards, another stone is let fall from the same point. Show that the space fallen through by the second stone in n se-

conds, reckoned from the commencement of its motion, is one-third of the space fallen through in the same n seconds by the 1st stone, supposing it not yet to have reached the earth.

(Mechanical Principle $v = gt$, $s = ut + \frac{1}{2}gt^2$.)

First stone, $u = gn$, $t = n$, $\therefore s = gn^2 + \frac{1}{2}gn^2 = 3(\frac{1}{2}gn^2)$.

Second stone, $u = 0$, $t = n$, $\therefore s' = \frac{1}{2}gn^2$.

6. As in Attwood's machine, a descending weight w draws up a weight p , which is less than w , by means of a string, which connects the weights and passes over a fixed pulley. Some time after the commencement of motion, the string is cut. Prove that the space through which p was raised, before the string was cut, bears to the space through which it will ascend after the string is cut, the ratio of $w + p$ to $w - p$, no account being taken of the weight of the string.

(Mechanical Principle; $2fS = v^2$.)

Before cutting $f = \frac{w-p}{w+p}$ and let $S = s$.

After cutting f equals g and let S equal s' . At the moment of cutting v is the same for both equations

$$\begin{aligned} \therefore 2 \frac{w-p}{w+p} gs &= 2gs' \\ \therefore s : s' &:: w+p : w-p \end{aligned}$$

7. From A, a point on the earth's surface, a particle is shot vertically upwards in the direction AB with an initial velocity of 50 feet in the second; and in the same instant another particle whose weight is less than that of the former in the proportion of 9 to 16, falls from rest at B. Shew that if AB equals 100 feet, the particles come into collision with one another, at a point which was their centre of gravity at the commencement of their motion.

(Mechanical Principle;—The Centre of Gravity is assumed to coincide with the Centre of Parallel Forces, determined by $ws = w's'$; $S = ut \pm \frac{1}{2}gt^2$.)

By the problem $w : w' :: 16 : 9$.

Also,

$$s = 50t - \frac{1}{2}gt^2$$

$$s' = \frac{1}{2}gt^2$$

$$s + s' = 100$$

$$\therefore s : s' :: 9 : 16$$

$$\text{and } w' : w :: 16 : 9$$

$$\therefore ws = w's'$$

8. A closed hollow cubical vessel, whose capacity is one cubic foot, is filled, to three-fourths of its capacity, with water; and the remaining space is filled with air whose elasticity is $\frac{1}{14}$, the elasticity of air that exerts a pressure of 15 lbs. on the square inch being 1. Show that when the vessel rests with its base on a horizontal floor, the whole pressure on the interior of the vessel is 3315 ounces, the weight of a cubic foot of water being 1000 ounces.

(Mechanical Principles;—Any pressure, or additional pressure, applied to the surface or to any other part, of an incompressible fluid kept at rest, is transmitted equally to all parts of the fluid; the whole pressure on any surface by an incompressible fluid acted on by gravity only is equal to the weight of a right column of the fluid, the height of which equals the depth of the centre of gravity of the surface under pressure, and the base a plane area equal to the area of the surface.)

Since the elasticity of the air is $\frac{1}{14}$, it will press with a force of 15 lbs. or 240 ounces to the square foot and \therefore by the former of the above principles, its whole pressure equals 6×240 , equals 1440 ounces. The latter principle gives for the pressure of the water

$$(1 + 4 \times \frac{1}{2} \times \frac{3}{4}) 750 = 1875 \text{ oz.}$$

$$\therefore \text{whole pressure} = 1440 + 1875 = 3315 \text{ oz.}$$

9. A cylinder, formed by the junction of two equal cylinders floats in water (sp.gr equals 1) with its axis, which is 2 feet in length, vertical. Show that if the depth of the centre of gravity of the united mass below the surface of the water be $3s - \frac{5}{8}$ where s is the specific gravity of the upper

of the two component cylinders, $2s$ shall be the sp. gr. of the lower cylinder. †

Mechanical Principles; $wd + w'd' = (w + w')D$; d being the distance from a fixed point of the the Centre of Parallel Forces of the body whose weight is w , &c.

The weights of different bodies are proportional to the product of their volumes into their specific gravities. A floating body displaces its own weight of liquid.

Let S' = sp. gr. of lower cylinder and h the height of the centre of gravity of the united mass above the base of the lower cylinder.

Since the cylinders are of equal volume, the second principle allows us to substitute S' and S for W and W' in the first principle, and since for cylinders of equal right-sectional area the volumes vary as the lengths, it reduces 'weight' in the third principle.

The problem now gives

$$\frac{1}{2}S' + 1\frac{1}{2}S = (S' + S)h, \text{ (i.)}$$

$$h + 3S - \frac{5}{8} = S' + S. \text{ (ii.)}$$

$$S' + 3S$$

$$\text{From (i.) } h = \frac{S' + 3S}{2(S' + S)}$$

$$\therefore h - \frac{5}{8} = \frac{-S' + 2S}{3(S' + S)}$$

$$\text{From (ii.) } h - \frac{5}{8} = \frac{S' - 2S}{S' - 2S}$$

$$\therefore S' - 2S = \frac{S' - 2S}{3(S' + S)}$$

$$\therefore S' - 2S = 0 \therefore S' = 2S$$

$$\text{or } S' + S = \frac{3}{2}S$$

But the latter would require one of the bodies to be repelled by the earth, and may therefore be rejected.

ALGEBRA—FIRST CLASS—TIME THREE HOURS.

1. Solve the following :

$$(a.) x^2 + 6xy + 27 = 0, \text{ (i.)}$$

$$y^2 - 2xy - 16 = 0. \text{ (ii.)}$$

$$(b.) \sqrt{(3x^2 + x - 1)} = 9x^2 + 3x - 5.$$

$$(c.) x^4 + 2x^3 + 2x^2 + 2x + 1 = 0.$$

(a.) (Elimination of the constant terms will give a homogeneous quadratic in x/y from which the ratio of $x : y$ can be found.)

16 (i.) + 27 (ii) gives

$$16x^2 + 42xy + 27y^2 = 0$$

$$\therefore 2x = -3y \text{ or } 8x = -9y$$

Substituting in (i.)

$$x = \pm 3 \text{ and } y = \mp 2$$

$$\text{or } x = \pm \frac{9}{\sqrt{13}} \text{ and } y = \mp \frac{8}{\sqrt{13}}$$

$$(b.) \sqrt{(3x^2 + x - 1)} = 3(3x^2 + x - 1) - 2.$$

Solving this quadratic in $\sqrt{(3x^2 + x - 1)}$,

$$\sqrt{(3x^2 + x - 1)} = 1 \text{ or } -\frac{3}{2}$$

$$\therefore 3x^2 + x - 2 = 0 \therefore x = 1 \text{ or } -\frac{2}{3}$$

$$\text{or } 3x^2 + x - \frac{7}{8} = 0 \therefore x = \frac{-1 \pm \sqrt{29}}{6}$$

(If $\sqrt{\quad}$ indicates the positive or arithmetical square-root the two latter values of x must be rejected as requiring $-\sqrt{\quad}$.)

$$(c.) x^4 + 2x^3 + x^2 + x_2 + 2x + 1 = 0$$

$$\therefore (x^2 + 1)(x + 1)_2 = 0$$

$$\therefore x^2 + 1 = 0 \text{ or } x + 1 = 0$$

$$\therefore x = \pm j \text{ or } -1,$$

(j is used for the square-root of negative unity.)

2. It is between 7 and 8 o'clock and the minute hand of a watch which indicates true time, but is uniformly losing one minute in 12 hours, is two minute-spaces behind the hour hand. What will be the true time when the minute hand of the watch is 9 minute-spaces ahead of the hour hand?

At the moment of true time let the hour hand have swept over x minute-spaces from 12, the minute hand will have *gained* $11x$ minute-spaces, but by the condition of the problem this is 7 times round the face, (60 minute-spaces each round), less 2 minute spaces.

$$\therefore 11x = 420 - 2 = 418$$

$$\therefore x = 38.$$

Hence it was true time at 7h. 36'.

From the moment of true time to the time required the minute hand *will gain* on the hour hand 11, (from 2 behind to 9 ahead), and consequently *will sweep over* 12 minute-spaces each, equal in time to $\frac{3}{2} \frac{1}{6}$ of a minute, or the time required will be 12',

x'' after the moment of true time, and therefore will be

$$7h. 48', 1''.$$

3. Find three numerical quantities in Harmonical Progression, such that the sum of their squares is 7, and the continued product of the quantities is half the sum of the extremes.

Let the extremes be $x - y$ and $x + y$.

The *mise en equation* is immediate

$$(x - y)^2 + \frac{(x_2 - y_2)^2}{x_2} + (x + y)^2 = 7, \text{ (i)}$$

$$\frac{(x_2 - y_2)^2}{x} = x, \text{ (ii)}$$

Divide each side of (ii) by x , subtract from (i), expand remainder and divide by 2.

$$x_2 + y_2 = 3$$

$$\text{From (ii) } x_2 - y_2 = \pm x$$

$$\therefore x = \pm \frac{3}{2} \text{ or } \pm 1$$

$$y = \pm \frac{1}{2} \sqrt{3} \text{ or } \pm \sqrt{2}$$

$$\therefore \text{ the Progression is } \pm \frac{1}{2}(3 - \sqrt{3}), \pm 1 \pm \frac{1}{2}(3 + \sqrt{3}),$$

$$\text{or } \pm(1 - \sqrt{2}), \mp 1, \pm(1 + \sqrt{2}).$$

$$4. \text{ Given } (m + 1)^2 + a(m + 1) + b = 0$$

$$\text{and } (m - 1)^2 - a(m - 1) + b = 0.$$

Prove that the roots of the equation $x^2 + 2ax + 4b = 0$, are

$$2(m + 1), \text{ and } 2(m - 1).$$

Multiply each of the given equations by 4 and reduce

$$\{ 2(m + 1) \}^2 + 2a \{ 2(m + 1) \} + 4b = 0$$

$$\text{and } \{ 2(m - 1) \}^2 + 2a \{ 2(m - 1) \} + 4b = 0$$

Comparing these with the proposed equation in x , shows it to be satisfied with $x = 2(m + 1)$ and $2(m - 1)$, and since that equation has but two roots these are they.

Another method is to eliminate a and b .

Multiplying the first equation by four and subtracting from the third

$$x_2 - 4(m + 1)x^2 + 2a \{ x - 2(m + 1) \} = 0$$

$$\therefore \{ x - 2(m + 1) \} \{ x + 2(m + 1) + 2a \} = 0 \text{ (i)}$$

Similarly from second and third

$$\{ x - 2(m - 1) \} \{ x + 2(m - 1) + 2a \} = 0 \text{ (ii.)}$$

Multiply (i.) and (ii.) each by the first

factor of the other and subtract the latter product from the former one.

$$4 \{ x-2(m+x) \} \{ x-2(m-x) \} = 0$$

$$\therefore x-2(m+x) = 0$$

$$\text{or } x-2(m-x) = 0.$$

5. If the sum of the roots of the equation $x^2+px+q=0$, be four times the cube of their sum; then either p or p^2+q must be zero.

Let a and b be the roots ;

$$a+b = -p \text{ and } ab = q$$

$$a^3+b^3 = (a+b)^3 - 3ab(a+b) = -p^3 + 3pq$$

$$\text{If } -p^3 + 3pq = -4p^3,$$

$$\text{then } 3p^2 + 3pq = 0,$$

$$\therefore p(p^2+q) = 0,$$

$$\therefore p = 0 \text{ or } p^2+q = 0.$$

$$d = n$$

6. If $\frac{d}{D^2} = \frac{n}{N}$, where d is the difference

of the roots of the equation $x^2+mx+n=0$, and D the difference of the roots of the

equation $x^2+Mx+N=0$, $\frac{m^2}{M^2}$ shall also be

$$\text{equal to } \frac{n}{N}.$$

Since $d^2 = m^2 - 2n$ and $D^2 = M^2 - 2N$

$$\therefore \frac{d^2}{D^2} = \frac{m^2 - 2n}{M^2 - 2N} \text{ which if } = \frac{n}{N} \text{ also } =$$

$\frac{m^2}{M^2}$ — by alternate composition twice.

7. A, B, C, and D, are stations on a railway, taken in order ; the distance of B from A, is 12 miles ; of C from B, 15 miles ; of D from C, 24 miles. At noon a train leaves A for D, and proceeds at a uniform rate; and 10 $\frac{3}{4}$ minutes before it arrives at B, another train leaves D for A, and also proceeds at a uniform rate. This latter train reaches C while the former, which suffered a detention of 34 $\frac{3}{4}$ minutes at B is still 3 miles from C. Passing C without stopping, it comes into collision with the train from A at 10 $\frac{3}{8}$ minutes past 2 o'clock.

Find the rates at which the trains left A and D respectively.

(Mechanical principle required in solution ; — For uniform velocity, velocity equals space \div time.)

Let R and r be the respective rates of the trains, in miles per hour. While the second train ran from D to C, (24 miles), the first train starting from B $\frac{3}{4}$ of an hour later, (10 $\frac{3}{4}$ ' + 34 $\frac{3}{4}$ ') ran to within 3 miles of C, i.e. ran 12 miles.

$$\therefore \frac{24}{r} = \frac{12}{R} + \frac{3}{4},$$

$$\therefore \frac{32}{r} = \frac{16}{R} + 1 = \frac{16+R}{R} \quad (i.)$$

The time the two trains were in running the

the 3 miles = $\frac{3}{R+r}$; besides this the first

train ran for the time required to go 24 miles (from A to within 3 miles of C) and was detained 34 $\frac{3}{4}$ ' ;

$$\therefore \frac{24}{R} + \frac{34\frac{3}{4}}{60} + \frac{3}{R+r} = 2 \frac{10\frac{3}{8}}{60}$$

$$\therefore \frac{8}{R} + \frac{1}{R+r} = \frac{17}{32} \quad (ii.)$$

But from (i) by alternate composition

$$\frac{48+R}{r \cdot R} = \frac{16+R}{R}$$

Eliminate $\frac{1}{R+r}$ between this and (ii)

$$\frac{8}{R} + \frac{16+R}{(48+R)R} = \frac{17}{32}$$

Solving this quadratic,

$$R = 16 \text{ or } -\frac{800}{17}$$

The latter value must be rejected as satisfying the conditions of the problem which were used in obtaining the equations but not the condition that the first train ran towards D, or in the opposite direction to the motion of the second train.

Substituting 16 for R in (i.) gives $r = 16$.

8. A commission merchant sells a quan-

tity of flour on commission at a certain rate per cent., and, under the instructions of his Principal, buys on a commission (taken on what was paid for the goods), at a different rate per cent.; and finds that his commission for both transactions is $4\frac{3}{4}$ cents for every dollar received for the flour. But had he sold the flour on the rate of commission for which he bought the goods, and bought the goods on the rate of commission at which he sold the flour, his commission for both transactions would have been $4\frac{8}{10}\frac{3}{8}$ cents on every dollar received for the flour. Find the two rates per cent. of the commissions.

Let R and r be the respective selling and buying rates per \$.

$$R + \frac{r(1-R)}{1+r} = .04\frac{3}{4}$$

$$\text{or } R + r = \frac{5}{102} \quad (i).$$

$$\text{Also } r + \frac{R(1-r)}{1+R} = .04\frac{8}{10}\frac{3}{8}$$

$$\text{or } \frac{R+r}{1+r} = \frac{5}{103} \quad (ii).$$

$$\therefore \text{ by conversion } \frac{R+r}{1-r} = \frac{5}{98}$$

Eliminating $R+r$ between this and (i).

$$\frac{1-r}{1+r} = \frac{98}{102}$$

$$\therefore r = .02 \text{ and } 100r = 2$$

$$\therefore R = .03 \text{ and } 100R = 3.$$

SELECTIONS.

TEACHING VS. HEARING LESSONS.

To one who is familiar with schools, the first glimpse of a class room, the first movement of a class, almost the first word spoken, reveals the character of the work done in it. Power and skill, or the lack of these are shown in every thing done, and felt in the very air. Both manner and results bear the unmistakable want of a master, or the equally clear signs of an apprentice or artificer. And this whether the work of a class be a "common" or a "higher subject; whether the lesson of the day be a familiar one or a new topic. A long visit may increase interest in the class or the subject and may disclose the source of power, but the *fruit* of good teaching in distinction from mere hearing of lessons is apparent on the face of things. It may not be possible to put all the points of this difference into words, for we often see and feel the force of that which we cannot state as a formal precept for another to follow,

but some elements of it may be separated from the complex whole.

1. It is immediately apparent that class and teacher now come together for some *definite purpose*. Each expects something of the other. The pupil is under a sense of responsibility to the teacher and the teacher to the pupil, and each will hold the other to his duty. There is an air of business, an attitude of attention, a silent but effective demanding, or rather expecting of attention and effort and of preparation of all that was required, together with a manifest readiness to be patient without sacrifice of thoroughness, to be rigid in requirements and conciliatory in manner, that give appearance of results. No time is wasted in delay, in dawdling, in asking and answering needless questions. Every thing needed in the class has been brought to the class, and every thing required for use, map, pointer, crayon, *paper and pencils*, is at

hand. No time is wasted in getting into order, or discussing "how far we went yesterday," or whether, "this was to be skipped," or in reminding the teacher that he promised to do this and that left over from last week. The teacher and the class have met for something understood by them both, and then proceed at once to do it.

2. *The teacher knows the lesson and knows it in such a way that he could recite as he requires the pupil to recite.* He does not need to keep his eye on the book and his finger on the place. *He can do without a book,* except as problems may be taken from it, or sentences given for analysis, or as it contains the text to be translated. It more frequently lies on the desk for occasional reference than is followed letter by letter. It is evident that the teacher is master of that part of the subject, that he sees how it grows out of a preceding part and prepares the way for what follows and he has estimated the relative importance of it, and just how much time he can afford to spare upon it. His questions show this; his explanations clear, right to the point, sharp and sharpening, confirm it; the manifest confidence of the class in his statements and the eagerness with which they seize and appropriate instruction make it plain that they are in the habit of receiving positive statements which will bear close questioning, and which will apply directly to the case in hand. Questions asked are for information, not "to catch the teacher"; the pupil knows that he will be expected to be sure of what he claims to understand, and that the teacher will not be satisfied until every point is made clear to all.

3. Teaching does more than to ask all the questions in the book, more than to go all round the class in order every day, more than to call for all the words of the text. It finds out, now in this way and now in that, *how much the pupil knows,* not how many words he can say; what application of knowledge he can make, not merely how many rules he can repeat. The teacher's knowledge is of things, not of words; he sees things in their uses and in their relations and they become to him signs not of learning only but of wisdom as well. And as face answers to face in the water, so the knowledge of the pupil, when a subject is finished is seen though in different degrees to answer to his own knowledge.

4. The teacher's knowledge of a subject

is also of such sort that it gives him the basis of all needed explanations and illustrations. He knows where difficulties lurk and how they can be met. He anticipates that such a step may be too much to take at once and divides it into two. He sees the need of some special illustration to aid in grasping a principle, and he inserts what will give necessary light. He knows how much the senses enlighten the mind and he puts a hard question with some *sensible* answer. He does not expect a child to understand the "book definition" of *horizon* unless he has first called attention to the fact that the earth and the sky *do* appear to meet at a certain distance from the observer. He does not suppose that many learners will "know for certain" how net-veined leaves differ from others unless the two have been compared, nor that they will know how "to write a composition" without information about the subject of it. He has had experience of all the trials of a learner and is ready to "bear a hand" when others ask for it. You may see how quick he is to vary a question, to add to an explanation, to lead the pupil into the light, to help him to perceive how this step follows that. His fertility of resources will not please more than his readiness to notice just when those resources must be used, and when the pupil should be left to his own devices.

5. *It compels,* or shall it be rather said *inspires?* pupils to use their own powers and does not allow them to suppose that all the heavy loads are to be carried by the teacher, but of all, the pupil must carry his part and of most, the whole. The pupil studies, the pupil wrestles with difficulties, the pupil tries and tries again, and in the end, the pupil gains the victory. He is aided, he is guided, he is encouraged and that is all; he does the work for he is held up firmly to it and not allowed to flinch. Just here, perhaps, more than anywhere else, the power of a true teacher is shown. When a child says, "I don't know," the hearer of lessons simply *tells* him; the teacher compels him to look, at least, for the truth. When the child says, "I can't do this," the former does it for him; the latter sets him at work to do it for himself. When the child is indifferent and careless, the one weakly does his task for him or lazily lets it go undone; the other by means as various as the resources of a fertile and

earnest mind, stimulates, provokes, urges him to do his task, for he will accept that of no substitute.—*H. B. Buckham, M. A., in N.Y. Educational Journal.*

THE OLD MAN GOES 'TO SCHOOL.

BY JOHN H. YATES.

[From the Syracuse Sunday Herald.]

<p>I know I'm too old to learn, wife ; my lessons and tasks are done, The dews of life's evenin' glisten in the light of life's settin' sun. To the grave by the side of my father, they'll carry me soon away ; But I wanted to see how the world has grown, and hobbled to school to-day.</p> <p>I couldn't have told 'twas a school-house, it towered up to the skies, I gazed on the noble structure till dimmer grew these old eyes ; My thoughts went back to the log-house—the school-house of years ago— Where I studied and romped with the merry boys who sleep where the daisies grow.</p> <p>I was startled out of my dreamin' by the tones of its monster bell, On these ears that are growin' deaf the sweet notes rose and fell. I entered the massive door, and sat in the proffered chair— An old man wrinkled and gray in the midst of the young and fair.</p> <p>Like the garden of bloomin' roses, the school-room appeared to me— The children were all so tidy, their faces so full of glee ; They stared at me when I entered, then broke o'er the whisperin' rule, And said, with a smile to each other, "The old man's comin' to school."</p> <p>When the country here was new, wife—when I was a scholar-lad, Our readin' writin' and spellin' were 'bout all the studies we had ; We cleared up the farm through the summer then travelled through woods and snow, To the log house in the openin'—the school-house of years ago.</p>	<p>Now, boys go to school in a palace, and study hard Latin and Greek ; They are taught to write scholarly essays ; they are drilled on the stage to speak ; They go in through the district hopper, but come out through the college spout ; And this is the way the schools of our land are grinding our great men out.</p> <p>Let 'em grind ! let 'em grind, dear wife ! the world needs the good and true ; Let the children out of the old house, and trot 'em into the new, I'll cheerfully pay my taxes, and say to this age of mind, All aboard ! all aboard ! go ahead ! if you leave the old man behind !</p> <p>Our system of common schools is the nation's glory and crown ; May the arm be palsied, ever, that is lifted to tear it down ; If bigots cannot endure the light of our glowin' skies, Let 'em go to oppression's shores, where Liberty bleeds and dies.</p> <p>I'm glad I have been to day to the new house, large and grand ; With pride I think of my toils in this liberty lovin' land, I've seen a palace arise, where the old school-house stood, And gardens of beauty bloom where the shadows fell in the wood.</p> <p>To the grave by the side of my fathers they'll carry me soon away ; Then I'll go to a higher school than the one, I have seen to-day ; Where the Master of masters teacheth—where the scholars never grow old— From glory to glory I'll climb, in the beautiful college of gold.</p>
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EXAMINATION QUESTIONS.

(We give in this No. as many as we can find space for of the questions at the recent examination for Teachers' Certificates, and will give the remainder in next No.)

THIRD CLASS.

ARITHMETIC.

4. Simplify $3\frac{1}{2} \times \frac{\frac{1}{2} \text{ of } \frac{5}{8} \times 7\frac{1}{2}}{\frac{1}{3} + 4\frac{1}{2} \text{ of } \frac{4}{7}}$

$$\frac{7\frac{1}{2}(\frac{5}{8} - 1\frac{1}{8} - \frac{1}{8} - \frac{1}{8})}{7\frac{1}{2}} \times 425.$$

$$\frac{7\frac{1}{2} \times 150\frac{1}{8} - 74\frac{3}{8}}{7\frac{1}{2}}$$

2. Water is composed of two gases, oxygen and hydrogen, in the proportion of 88.9 to 11.1; what weight is there of each in a cubic yard of water? (cubic foot of water weighs 1000 oz.)

3. The sum of \$1,416 is to be divided among 15 men, 20 women, and 30 children in such a manner that a man and a child shall together receive as much as two women, and all the women shall together receive \$480; find amount received by each man, woman, and child, respectively.

4. A bankrupt who is paying 37½ cents in the dollar, divides among his creditors \$6,300; what do his debts amount to?

5. It costs \$96.25 to carpet a room 22ft. 6 in. long, with carpet 27 in. wide and \$1.75 ¼ yard; find the width of the room.

6. If 3 men or 5 boys can do a piece of work in 17 days; in how many days will 5 men and 3 boys do a piece of work three times as great?

7. Find the cost of 38 yds. 2 qrs. 3 nails of cloth when 3.75 yds. cost \$3.825.

8. A man invests half his fortune in land, a fifth of it in Bank Stock, a sixth in provincial debentures, and loses the remainder (\$8,000) in speculation—What was his fortune at first?

9. Bought 9,000 bushels of wheat at \$1.12½ a bushel, payable in 6 months; I sold it immediately for \$1.06 a bushel, cash, and put the money at interest at 10 per cent. At the end of the 6 months I paid for the

wheat; did I gain or lose by the transaction, and how much?

10. In an examination, Arithmetic and Grammar are valued at 200 marks each; Education, Geography and History, at 150 marks each. A candidate obtains 70% in Arithmetic, 65% in Grammar, 60% in Education, 50% in History, and 40% in Geography: find his average rate per cent. (i.e. rate per cent. obtained of the aggregate marks.)

GEOGRAPHY.

1. Explain the following terms: climate, glacier, delta, estuary, latitude, zenith, tropics.

2. Describe the physical features of the Province of Quebec. Be concise.

3. Mention in order the chief European ports on the Atlantic.

4. A vessel sails from Riga to Hull; of what is her cargo likely to consist?

5. Name in order the chief lake and river ports of the United States east of Chicago, and assign them to their respective States.

6. Enumerate the republics of Europe. What is a republic?

7. Where, and for what remarkable, are Boulogne, Londonderry, Zante, Upsala, Culloden, Carthage, Birmingham, Solferino?

8. Name the rivers of Europe discharging into the Baltic, with the principal cities on their banks.

9. State what you know of the geographical distribution of coal in Great Britain and America: enumerate the chief coal fields, and mention one important town in each locality.

10. Draw a map of the Maritime Provinces of the Dominion.

11. Define accurately the position of the following:—Sitka, Vere Cruz, Mingan Islands, Gut of Canso, Queen Charlotte Sound, Baie Verte, the Bay Islands, Denver City, Milan, Straits of Bonifacio, Gulf of Lepanto, Restigouche River, Lake Temiscaming, Skye, Schleswig.

HISTORY.

1. What was the origin of the American slave trade.
2. Give an account of the voyages of Marco Polo.
3. Into what provinces did the Romans divide Britain? State their relative position.
4. Name the Plantagenet Sovereigns of England. Which of them interfered in the affairs of France, and with what results?
5. State what you know of the battles of Shrewsbury and Worcester.
6. In whose reign did the following persons live, and for what were they remarkable?—William Caxton, Sir Thomas Wyatt, the Duke of Monmouth, Lord Chancellor Clarendon, Richard Arkwright, James Watt.
7. What was the Cabal Ministry.
8. State the principal causes which led to the American revolutionary war, and name in order the leading events in it. Give dates. Be concise.
9. Write brief explanatory notes on the following:—(a) The Darien Company. (b) The Treaty of Dover. (c) The Convention of Cintra.
10. Contrast the Britain of to-day with that of the time of Queen Elizabeth.

ENGLISH COMPOSITION.

Write a letter to a Board of Trustees, recommending the establishment of a School Library.

ENGLISH GRAMMAR AND ETYMOLOGY.

"The Sportsman *very often tells you that his pleasure is not derived from the death or suffering which he inflicts; but he cannot deny that his pleasure is inseparably connected with death or suffering.*—*E. A. Freeman.*

1. Parse the ten italicized words.
2. Divide the extract into propositions, state their relations to one another, and fully analyse them.
3. Quote any six rules of syntax that are exemplified in the following extract and point out their application:—
"Those who can judge impartially of the general principle, have no means of knowing whether the general principle is rightly or wrongly applied to particular cases."—*E. A. Freeman.*
4. Form or quote a sentence containing a dependent proposition equivalent to an adverb.
5. Re-write the following sentences so as

to change the grammatical construction, but express the same meaning:—

- 'To me the case seems to stand thus.'
'In arguing about field sports I was arguing with people whose doings were open to the world.'
'He speaks the truth.'
6. Write the past tense, present participle and past participle of 'shoe,' 'job,' 'dye,' 'lie down,' 'omit,' 'prefer,' 'wink,' and 'chew.'
7. Write the plural of 'potato,' 'cheese,' 'policy,' 'chimney,' 'soliloquy,' and phenomenon'; the singular of 'species,' 'apparatus,' and 'indices,'; and the feminine of 'beau,' 'earl,' 'lad,' 'stag,' and 'ram.'
8. Give the different forms assumed by the prefixes 'in' and 'ad' in composition, illustrating your answer by examples.
9. What are the meanings of the prefixes 'para,' 'meta,' 'ob,' and 'be,' and the affixes 'ness,' 'ly,' and 'dom.'

EDUCATION AND SCHOOL LAW.

1. Define Education; and state the various Educative influences to which young people in this county are commonly subjected.
2. What is meant by School Organization? Show how you would proceed to organize a New School of 50 Scholars.
3. Draw up a Time Table for the use of such a School.
4. Give notes of a Lesson on 1. The Verb. 2. Multiplication. 3. The Sheep.
5. How would you seek to make your pupils proficient in Spelling?
6. What is the approved method of teaching the Second Book?
7. Specify the duties of Public School Teachers. What is a "Public School Teacher"?
8. How would you seek to reduce to a state of good discipline a school which had become disorderly?

SECOND CLASS.

HISTORY.

1. Give a short account of the Roman occupation of Britain; with dates where you can.
2. Explain concisely what is meant by "Monopolies," "The Lollards," "The High Court of Justice," "The Great Commoner."
3. When was the foundation of the British power in India laid, and by what means?

4. Give a short account of the reign of Queen Elizabeth.

5. State what you know of The Treaty of Troyes; The Act of Settlement; The war of the Spanish succession.

6. Who were the great navigators that followed Columbus on voyages of discovery?

7. Give a brief sketch of the career of Champlain in Canada.

8. What were the chief causes which led to the establishment of the present constitution of the Dominion?

9. With what important historical events are the following places connected:—Salamis, Arbela, Zama, Rywick, Saratoga, Appomattox? Give the dates.

10. State briefly what you know of the Emperor Maximilian of Mexico.

EUCLID.

1. When is one straight line said to be perpendicular to another?

To draw a straight line perpendicular to a given straight line of an unlimited length, from a given point without it.

2. If one side of a triangle be produced, the exterior angle shall be greater than either of the interior opposite angles.

3. If two triangles have two angles of the one equal to two angles of the other, each to each; and one side equal to one side, namely, sides which are opposite to equal angles in each; then shall the other sides be equal, each to each.

4. What are parallel straight lines?

If a straight line, falling on two other straight lines, make the alternate angles equal to one another, the two straight lines shall be parallel to one another.

5. What is a parallelogram?

Parallelograms on equal bases, and between the same parallels, are equal to one another.

6. If two isosceles triangles be on the same base, and on the same side of it, the straight lines which joins their vertices, will, if produced, cut the base at right angles.

7. Let ABC be a triangle, in which the angle ABC is a right angle. From AC cut off AD equal to AB, and join BD. Prove that the angle BAC is equal to twice the angle CBD.

8. If a straight line be divided into two equal parts, and also into two unequal parts, the rectangle contained by the unequal parts, together with the square on the line bet-

ween the points of section, is equal to &c. 5. II.)

9. In every triangle, the square on the side subtending an acute angle is less than the squares on the sides containing that angle, by &c. (13. 11). (It will be sufficient to take the case in which the perpendicular falls within the triangle.)

10. To describe a square that shall be equal to a given rectilineal figure.

11. The square on any straight line drawn from the vertex of an isosceles triangle to the base is less than the square on the side of a triangle by the rectangle contained by the segments of the base.

BOOK-KEEPING.

1. Explain the difference between Single and Double entry.

2. Describe the Day Book, Ledger, Bill Book, and the Invoice Book.

3. How are the following accounts balanced: Merchandise, Interest, Private Accounts.

4. Describe fully a Trial Balance?

5. What errors may occur in posting which the Trial Balance will not discover?

6. Give Day Book entries which would be journalized as follows:

(1.) Merchandise, Dr.	
To Bank of Commerce.....	\$ 300 00
(2.) Bills Payable, Dr. to Sundries	
Interest	\$50 00
Cash	500 00— 550 00
(3.) Merchandise, Dr. to Sundries	
.....	250 00
Cash	750 00
Bank of Commerce.....	875 00
	1875 00

4. Sundries, Dr. to Sundries—	
Merchandise.....	\$300 00
Interest	4 00
Bills Receivable	200 00
Cash	104 00

7. Journalize the following Day Book entries:

(1). Received from H. A. Smith & Co., Montreal, to be sold on their account and risk, 200 bbls. Fish, invoiced at \$950 per bbl. Paid freight and cash \$110.00.

(2). Shipped per Steamer "Toronto," and consigned to Morrison & Co. Montreal, to be sold on our account and risk:

Merchandise as per invoice	\$3000 00
Paid Labor and Insurance	85 00

(3). Closed H. A. Smith & Co.'s Consignment, and rendered them account of Sales of the same:

Our charge for Storage and Advertising	\$54 00
Commission	60 00
H. A. Smith & Co.'s net proceeds	\$1886 00

(4). Thomas Jones has redeemed his note, due three months hence for..... \$1200 $\frac{90}{100}$
 Discount allowed him..... 18 $\frac{90}{100}$
 Received the balance in cash \$1182 00

NATURAL PHILOSOPHY.

1. ACB is a bent lever, the fulcrum being C. The arms AC and CB are straight; and the angle formed by BC and AC produced is $\frac{2}{3}$ of a right angle. If a weight of 10 lbs. acting at A balance a weight of 8 lbs. at B when the arm AC is horizontal, find what weight at A will balance a weight of 8 lbs. at B, when BC is horizontal.

2. (a) Enunciate the principle of virtual velocities.

(b) Assuming the principle, apply it to determine the relation between the Power and the Weight in the Wheel and Axle.

3. (a) Draw a diagram, representing a system of pulleys (three movable pulleys in the system) in which a separate string passes round each of the pulleys.

(b) Apply the principle of virtual velocities to determine the relation between the power and the weight in this system of pulleys.

4. (a) Enunciate the principle of the parallelogram of forces.

(b) If a particle at A be acted on by two forces represented in magnitude and direction by the lines AB and AC respectively, CAB being a right angle; if the length of AB be 5 feet, and the length of the resultant of the two forces be 13 feet; find the length of AC.

5. State Boyle's law for elastic fluids, and show how it may be experimentally established.

6. Calculate the height of the barometric column, when the atmospheric pressure is $28\frac{2}{3}$ ounces on the square inch; the specific gravity of mercury being 13.6 while that of water is 1. (See *Note*.)

7. (a) Draw a diagram exhibiting the essential parts of the common pump, and explain the action of the Machine.

(b) The height of the valve through which the water passes from the lower into the upper cylinder in the common pump, must always be less than a certain quantity, which varies with the height of the barometric column. Why so? Find the quantity referred to, when the height of the barometric column is 29.8 inches; the specific

gravity of mercury being 13.6, while that of water is 1.

8. Define *Specific Gravity*. A piece of silver weighs 4 oz. in air, and 3.6 oz. in water. Find its specific gravity.

9. A body, 1 cubic foot in volume, and having a sp. gr. of $\frac{7}{10}$, while the sp. gr. of water is 1, requires a downward pressure of m oz. in order that it may be completely immersed in water. Find m . (See *Note*,—In solving this question, explain at the same time the principle on which the solution proceeds.)

10. Describe the syphon, explaining distinctly the principle of its action.

Note.—The weight of a cubic foot of water may be assumed to be 1000 ounces.

CHEMISTRY, BOTANY, AND PHYSIOLOGY.

1. Explain the constitution of the atmosphere, and state the origin of the minor substances that occur in it.

2. What gases pass out at the top of the chimney of a lamp when it is burning? Explain the formation of those that are compound.

3. State and explain the laws which govern chemical combinations.

4. Name and describe the parts of a complete flower and leaf.

5. Explain the importance of $C O_2$ in relation to plant life.

6. Define the terms *endogen*, *exogen*, *legume*, *cereal*, *cotyledon*, *plumule*.

7. Enumerate the bones of the trunk.

8. Describe the process of digestion.

9. Classify the teeth of an adult.

EDUCATION AND SCHOOL LAW.

1. Mention the qualifications which, in your opinion, are necessary to form the accomplished Teacher.

2. Give an outline of any work on Education which you may have studied, and express your opinion of it.

3. State the various educative influences to which Canadian children are usually subjected, and estimate their relative force in training the young.

4. Enumerate the particulars in respect to the external condition of (a) premises, and (b) pupils, which demand the Teacher's daily inspection.

5. What is comprehended in "Discipline?" Regarding it as School-government, point out prevalent faults in Schools; and describe the system of "a good disciplinarian."

6. How would you explain to a class the difference between Vulgar and Decimal Fractions? Give twelve examples of the kind of questions you would put to the class in order to test their knowledge of Fractions.

7. Enumerate the essentials of good Reading; and describe your method of teaching the Third Book.

8. What, under the Regulations, constitutes "adequate School accommodation?"

9. What are the specific duties of Public School Teachers, as laid down in the Act?

GEOGRAPHY.

1. Derive and explain the terms Antartic, Asteroid, Isothermal, Horizon, Node.

2. What is included in Mathematical Geography? Give notes of an introductory lesson on Mathematical Geography.

3. Give the form of government, religion, and capital of the following:—Siam, Persia, Iceland, Egypt, Servia, Sweden, Chili.

4. Where, and for what remarkable are Smyrna, Queenstown, Avignon, Wolverhampton, Bombay, Damascus, Jeédah, Miquelon, Antananarivo, Port au Prince, Granada, Heligoland?

5. Trace the course of the Danube, Rhone, and Susquehanna, naming the principal cities on their banks, and their chief tributaries.

6. Name the States of the American Union situated in the Valley of the Mississippi, with their capitals.

7. Describe the physical features of British Columbia.

8. Mention the seats of the hardware, linen, woollen, cotton, and earthenware manufactures of Great Britain and Ireland, and name one principal town in each locality.

9. Describe the mountain systems of South America.

10. Draw an outline map of the portion of the Dominion lying east of Quebec.

ENGLISH GRAMMAR AND ETYMOLOGY.

"*K. Rich.* Of comfort no man speak;
Let's talk of graves, of worms, and epitaphs;
Make *dust* our *paper*, and with rainy eyes
Write sorrow on the bosom of the earth.
Let's choose executors, and talk of wills:
And yet *not so*,—for what can we bequeath
Save our deposed bodies to the ground?
Our lands, our lives, and all, are *Bolting-
brokes*,
And nothing can we call *our own* but death

And that small *model* of the barren earth
Which serves as *paste* and cover to our
bones." SHAKESPEARE.

1. Parse the sixteen italicised words.

2. Divide the extract into propositions, state their relations to one another, and analyse them.

3. Make a list of the words of classical origin in the extract.

4. Make a list of five words from each of the Latin verbs *ago, curro, jacio, fero, video, and rego*.

5. Define and give examples of ADVERBIAL SENTENCE and COMPLEX SENTENCE, and form or quote a sentence containing a dependent proposition which is the subject of a verb.

6. Correct the following sentences, giving your reason for every change you make:

"Even remote and minute events are objects of a curiosity, which, being natural to the human mind, the gratification of it is attended with pleasure."—ROBERTSON:—*Charles the Fifth*.

"In nearly all cases in the East, woman was kept very much under subjection, and even to the present day the female sex in the East do not enjoy that equality with the male sex which she possesses in western countries."—ANON.

"The luxuriance of the Eastern countries, their boundless wealth and tempting prospects, together with the restless, enterprising disposition of its inhabitants, at once furnishes us with scenes of social interest and political influence to which the pages of history hardly gives a parallel."—ANON.

7. Give a classification of conjunctions.

ENGLISH COMPOSITION.

Any one of the following subjects may be chosen:—

A description of the town in which the examination is held.

"The proper study of mankind is man."
The Post-office.

MUSIC.

1. Define the following:—Music, Scale, Interval, Chord, Semitone, Clef, Degree, Time, Canon, Round, Natural, *Solfeggio*.

2. Explain what is meant by "Accent" in Music, and state what are the accented parts of a bar of common time

3. What is Syncopation, and how is strong Syncopation marked?

4. How many kinds of Octave are there

in the Diatonic Scale, and of what composed?

5. Transpose a passage from the Scale of Do to the Scale of Re.

6. Write notes of an introductory lesson on the Chromatic Scale.

7. Explain the following Musical terms, and give the marks for them:—Mezzo-Staccato, Staccato, Legato, Da Capo, Dal Segno.

8. Name and distinguish the two modes of the Diatonic Scale.

DRAWING.

1. Show how to describe a Circle about an Equilateral Triangle.

2. Give the different steps in the drawing of an Ellipse.

3. Draw a design for an ornamental tiled floor, to consist of Octagons and Squares.

4. Inscribe a Circle in a Nonagon.

5. Draw a "Pointed Horse-Shoe Arch," an "Early English Arch," and a "Semi-Elliptical Arch," explaining your methods.

ZOOLOGY, BOTANY, AND AGRICULTURAL CHEMISTRY.

1. By what differences are living bodies,

whether plants or animals, distinguished from unorganized bodies?

2. To what sub-kingdom, class, and order do the reef-building coral, the lobster, the centipede, the crocodile, the ant, and the wolf respectively belong?

3. Give the characters of the classes Reptilia and Arachnida, and of the orders Raptores, Cheiroptera, and Cetacea.

4. Name the parts of a typical flower, and describe the classes of flowers constituted by the various departures from the type.

5. Draw a cyme, a corymb, a palmately compound leaf, and a retuse leaf.

6. Describe the Pink Family botanically.

7. Describe potassium and silicon; name and give the chemical symbols for their more important compounds; and explain their value as constituents of soils and plants.

8. Give an account of the steps to be taken in raising a crop of turnips.

9. Write notes on the proper care of stock.

EDUCATIONAL INTELLIGENCE.

CANADA.

—We are unable to find space this month for the large number of Teachers' Conventions that have been held during the past month. Most of them were occupied with the discussion of the question of a representative to the Council of Public Instruction. In accordance with a call issued by the Executive of the Ontario Association for the advancement of Education, a convention of delegates elected by the teachers of the different Inspectoral Divisions met at Toronto, on July 17th, to nominate a Candidate to represent the teachers in the Council of Public Instruction. Altogether 55 delegates were present, and presented their credentials. Mr. Watson of Weston, acted as Chairman, and Mr. Dickenson of Brantford as Secretary. After the report of the Committee on Credentials had been adopted, the Chairman addressed the convention, pointing out their duty, and saying there were only two Candidates now before

them, Dr. Sangster, and Professor Goldwin Smith, and their choice must be between these two. Dr. Sangster was then nominated by Mr. R. Dawson of Belleville, seconded by Mr. John M. Moran of Waterloo. Professor Goldwin Smith, was nominated by Mr. S. MacAlister of Toronto, seconded by Mr. A. Black of East Middlesex. The movers and seconders spoke at some length in favor of their respective candidates, and speeches were also made by others, including Messrs. J. H. Donaldson and Fullerton. A scene of considerable confusion ensued arising from an attempt by a Mrs. Wm. Sangster to speak before the Convention. At last a motion to adjourn was put and lost: an amendment to have the vote taken at once was carried. It was also decided to have the vote taken by ballot, and on this being done it was found to stand, Sangster 27, Smith 25, McCallum 1.

—The fourteenth Annual Convention of the Ontario Teachers' Association will be

held in the Theatre of the Normal School Buildings, Toronto, on Tuesday, the 17th of August next, at three o'clock in the afternoon, and continue in Session three days.

Tickets of membership can be procured by communicating with the Secretary. The annual fee is fifty cents to those who are members of Branch Associations, and one dollar to others. Ladies, who are engaged in teaching free.

Most of the Railway Companies have agreed to grant Return Tickets to members attending the Convention for *one and a third fare*, which must be presented at the beginning of the journey.

Efforts will be made to secure accommodation on as favourable terms as possible for members of the Association while in Toronto. A person will be in attendance at the Theatre of the Normal School buildings, on the first day of the Session, to give the necessary information.

The opening Address will be delivered by the President, Professor Goldwin Smith, at half-past seven o'clock on Tuesday evening.

Addresses may be expected from the Rev. Dr. Ryerson, Chief Superintendent, and Dr. Wilson, of University College.

Papers will be read on the following subjects :

1. Where we stand, by Dr. Kelly, County Inspector, Brant.
2. The Antiquity and the Dignity of the profession of the Public Teacher, by Robt. McQueen, Esq., Teacher.
3. Certain Modern Theories of Education, and the methods founded thereon, by J. C. Glashan, County Inspector, W. Middlesex.
4. J. M. Buchan, High School Inspector _____.

The following Committees will report :—

The Committee of Public School Masters.

The Committee of Public School Inspectors.

The Committee of High School Masters.

The Text-Book Committee.

The Normal-School Committee.

The Industrial-School Committee.

Any member of the Association may propose other subjects for discussion, which if approved by the Board of Directors, will be introduced to the Association, with the understanding that the proposer lead off in the discussion.

—By arrangement with the Honourable the Postmaster-General, the Chief Superintendent of Education has had Voting Papers for Members of the Council of Public Instruction printed with envelopes attached, so that when folded and enclosed in the envelopes unsealed, as directed, they could pass through the Post Office prepaid for one cent each. The direction printed on the back of the envelope was issued simply to meet the requirement of the Post Office Department in regard to such matters; but as some misapprehension exists on the subject, the Honourable the Attorney-General is of opinion that the Inspectors, Masters and Teachers using these Voting Papers are entitled to seal the envelopes, they prepaying the ordinary three cent letter postage on them.

The Voting Papers should be received by the Chief Superintendent sometime between the 17th and 18th of August, both days inclusive. The law on the subject is as follows :

“ Any Voting Papers received by post or otherwise by the said Chief Superintendent, or other officer appointed by him during the preceding week, shall be deemed to be duly delivered to him.”

As this rule may not have been in all cases observed, and with a view to enable Inspectors, Masters and Teachers to exercise their franchise according to law, a blank Voting Paper and envelope will be sent to every person whose name has been returned to the Education Department as entitled to vote under the Act.

In putting up this Voting Paper and sending it to the Chief Superintendent, every blank in the form should be filled up, and the name signed at the bottom of the paper on the line left for that purpose.

It would be a great convenience if the name of the County, City or Town of the Voter were inserted in the blank for it, printed on the outside of the envelope.

EDUCATION DEPARTMENT,
Toronto, July, 1874.

The Honourable the Attorney-General has also given his opinion on the following points :—

- 1st. That none but legally qualified teachers in actual service can vote for a member of the Council of Public Instruction. Teachers, therefore, who have left the profession have no vote.

2nd. That a County Inspector holding the office of Town Inspector has only one vote for a member of the Council.

UNITED STATES.

The revised announcement of the meeting of the National Educational Association to be held in Detroit, Aug. 4th, 5th, and 6th, states that President Porter, of Yale College, will speak on the National University question, and that Prof. J. K. Hosmer of the University of Missouri, and Prof. James Orton, of Vassar College, will read papers on the question of coeducation. "What constitutes a Consistent Course of Study for Normal Schools" is the title of Prof. Ogden's paper. He is associate principal of the Ohio Central Normal School, not "Assistant Principal" as stated in the first circular. We are sorry to learn that none of the railroads, except the Detroit and Bay City, the Grand Trunk, and the Great Western, grant reduced rates of fare. The hotels will charge from \$1.50 to \$3.00 per day.

—California is to try the experiment of compulsory education. The law which takes effect July 1st, provides that persons having charge of children between the ages of eight and fourteen shall send them to a public or private school for at least two-thirds of the school year of the district in which the children reside. Exceptions are allowed in cases of bodily or mental weakness, sickness or extreme poverty of parents, and when they already acquired a good knowledge of the branches of study taught in the primary schools, or when they reside more than one mile by the nearest travelled road from the public school. The penalty imposed on parents and guardians is \$20 for the first offence, and \$50 for each subsequent offence. This law brings the school system of California nearer the Prussian model than that of any other American state. The text-books used in all the Schools, and the course of study and instruction are prescribed by a State Board, and even the questions used by the county and city examiners in the examination of teachers are prepared and prescribed by the State Board of Examination, which has also power to grant four grades of state certificates. In no other state is teaching as fully recognized as a profession as in California.

BRITISH AND FOREIGN.

The report of the Irish National Board of

Education for the year 1873, mentions that 412 teachers permanently left the service during the year, 159 of whom had been trained in Dublin at the public expense. Forty-one entered the civil service, 61 married, 21 became commercial clerks, 56 emigrated, 32 were dismissed. There are now on the rolls in Ireland 1,020,130, and an average daily attendance of 373,371, or 17,550 over the number for 1873. The total independent receipts from school fees, etc., were about £35,000.

—The Senate of the University of Dublin re-assembled recently, for the consideration of the proposed changes in the government body and the status of that institution. Immediately after routine business had been transacted, Mr. Butt's amendment was brought forward, in the unfavorable absence of the member for Limerick, by Dr. Haughton. Mr. Butt proposed an adjournment for three months and the appointment of a committee to prepare a plan whereby both the ancient constitution of Trinity College might be established within the University for the Catholics of Ireland. It was a fine opportunity for the Senate to win for itself the affection of the nation; but the Senate did not show itself equal to the occasion.

—A Berlin schoolmaster, writing from Fagi to Japan, the *Bersenszeitung*, gives an amusing account of the difficulties he has had to contend with in teaching German to the Japanese. On arriving at Fagi he found that there was no German-Japanese dictionary, so that he could only make himself understood by speaking English or Dutch, or else by employing an interpreter when he had to talk to a person who did not understand either of the above languages. Two German-Japanese dictionaries were afterwards procured, but they were incomplete. The Japanese learn rapidly, but they are fond of change, and have no perseverance, so that the teachers are obliged frequently to alter the subject of study. Moreover, their best pupils leave them just as they are beginning to get on; directly a Japanese begins to understand a few words of German, he goes to Yeddo to seek employment. Fortunately the number of pupils is very great. Since the Emperor himself has taken to study, and Government appointments at Yeddo are only given to educated people instead of being sold to the highest bidder, it has become fashionable to

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go to school. Nobody now dares to learn French, but English and German are very popular, the latter language especially. The present Government (adds the correspondent, deserves great credit for its attempts to promote education among the middle and lower classes, and to protect them against the oppression of the nobility by special laws; but it is to be feared that these efforts will be to a great extent neutralized by want of perseverance, both on the part of the authorities and of the students, and, what is even worse, by want of money. The expenditure in the educational department exceeds the revenue, and it will scarcely be

possible to cover the deficit by further economies. Moreover, a certain impatience is being manifested at the comparative insignificance of the results hitherto attained by the introduction of European institutions. The people cannot understand any other form of government than the despotic; they do not appreciate the reforms introduced by the Emperor and his Ministers, and they even complain that in the European calendar, which has been adopted in Japan since last year, there is no Imperial decree stating the periods when Winter clothing or Summer clothing is to be worn.

 CHOICE MISCELLANY.

THE CHILD HAS RIGHTS.—Let the teacher respect these rights. The highest good of the pupil is ever kept in view. Cheerful and glad obedience from ennobling motives, is the great desideratum in school government. The teacher may reprove, restrain, and even use severe punishments in training pupils to right habits. The pupils feel that the firm hand is impelled by a loving heart, and guided by a wise head. Such chastisements work in him the resolve to forsake the wrong and to do the right.—*American Journal of Education.*

THE FUTURE CITIZEN.—From the family the child passes to a wider field of activity in the school. From the school to a still wider field of active life. He assumes the responsibility and exercises the right of citizenship. Parent guide and protect the child. In the school he is taught self-reliance, and is trained to help govern others. The school is a miniature republic of which the teacher is president. Here the child is fitted for citizenship. The school is a community of which the teacher is the leader. Here the pupil is trained for society. The pupils are indirectly the teacher's constituents. His re-election may depend on his power to lead them up to a higher life; to train them to self-reliant action; to develop in them a profound respect for law; to create in them willingness to obey and sustain right regulations.

Do.—All doers do not bear the name

nor meet with the fame of an Archimedes or a Newton; yet we can all work in a small way. Though like the silly fly in the fable, we may do nothing but buzz about the chariot wheels of Progress, the faintest hum of encouragement is more praise-worthy than the helpless sigh of despair; and it is better to become grey with the dust from those same chariot wheels, than to dream our lives away in slothful ease, even though our home may be the snowy depth of a perfumed lilly.

We can all do, thank God! There is none so poor, none so weak that he must remain idle in life's harvest field. If we cannot go forth with the reapers and bear with them the burden and heat of the day, we can welcome with words of peace and food of cheer their happy coming home. If our hands are too feeble to draw the sword in the sad conflict between Right and Wrong, we can wipe with the gentler touch the damp from the brows of the dying and bind with more deft fingers the wounds of the unfortunate. If our feet are too frail to tread down the sharp briars by which our fellow travellers are wounded, with tears of deepest pity we can soften the cruel thorns. Though, like the loved and loving disciple, we may not be permitted to lean against the divine heart of Jesus; we may surely reach, with hands of faith, the hem of His sacred, seamless robe. Shall we despair because many mighty workers, departing, have left behind them foot-prints too gigan-

tic for our diminutive feet, and think, when some lofty singer has filled the world with melody, that there is no space left for our one weak note? It is a grand thing to sow broadcast over wide fertile fields; to know that happy workers will gather the fruits of our sowing; that the flash of their sickles will fill the earth with a divine lightning and the echoes of their happy songs stir the depths of the most stagnant mind. But if

we possess no broad fields nor grain with which to sow them, shall we push aside our little plot of earth and leave our few pansy seeds unsown? If the contemplation of their purple and golden glory should lure one mind from dull earthly care to Him who is the fountain head of all beauty, will our labor have been in vain?—*Grace A. Brown in N. Y. Educational Journal.*

TEACHERS' DESK.

J. C. GLASHAN, ESQ., EDITOR.

(In order to make room for Examination questions, and as a number of mathematical solutions are given among contributions, the 'Desk' is confined this month to the giving of a few problems.)

Contributors to the 'Desk' will oblige by observing the following rules:

1. To send questions for insertion on separate sheets from those containing answers to questions already proposed.

2. To write on one side of the paper.

4. To write their names on every sheet.

PROBLEMS AND QUERIES.

69. Parse 'all' stanza I., line 1, and 'better stanza I., line 1, Third Reader page 209.

L. S. J., RAVENSWOOD.

70. Parse 'Though' and 'but' in line 34, page 89, Fifth Reader.

T. J. CODFREY, Seaforth.

71. How many gallons of water will be required to fill a boiler 15 feet long inside and 50 inches internal diameter, having 64 flues each $3\frac{1}{4}$ inches external diameter, the water to come within 18 inches of the top covering all the flues?

W. BRYCE, Watford.

72. A cistern is kept constantly supplied with water at a uniform rate, the cistern being full when 10 equal taps are opened it is emptied in 20 minutes, with 15 open it is emptied in 5 and 5/7th minutes; how many such taps being open would empty it in $3\frac{1}{2}$ minutes?

D. FRANCIS, Mitchell.

73. The G. C. M. of two Numbers is 179; the L. C. M. is 56,385; find the Numbers. Give a general method of solution.

D. FRANCIS, Mitchell.

74. Solve (58) given $AM=a$, $MN=c$, $ND=b$.

EDITOR.

EDITOR'S DRAWER.

—Read B. H. Rothwell's advertisement on second page of cover.

READING AS AN ART.—The fourth of Mr. Lewis' valuable papers on reading, will appear in the September No.

DIAMOND PNEUMATIC CURE.—We would call special attention to the advertisement of this popular medicine on outside page of cover.

UNIVERSITY OF TRINITY COLLEGE—MEDICAL DEPARTMENT.—We would call special attention to the advertisement of this flourishing institution. The staff of Professors is very efficient, and the school is very largely attended.

COUNCIL OF PUBLIC INSTRUCTION.—We regret very much that we inadvertently omitted, in last issue, to give the name of C. S. Wood, esq., M.P.P., among the list of Inspectors' Candidates for election to the Council of Public Instruction. Mr. Wood is a candidate, and we are glad to know that any injury which we may have unintentionally done his

candidature, has been promptly corrected by a circular issued by Messrs. Reazin and Knight, Inspectors for Victoria County.

FREE LECTURES ON ELOCUTION WITH SIMULTANEOUS EXERCISES.—Mr. Richard Lewis will give from three to four lectures on the Art of Reading and Delivery to Teachers attending the Annual Conference in Toronto, in August next. The lectures will embrace a description of the vocal organs and their management in speaking, methods of practice for cultivating power and expressiveness of voice, the principles of elocution, including *Time*, *Pause*, *Pitch*, *Inflection*, and *Emphasis*, and the analysis of passages selected from the 4th and 5th Reader, so as to show the application of philosophical principles to Reading as an Art. Teachers are requested to bring the 4th and 5th Readers with them, as they will have simultaneous practice in all the exercises. The lectures will be free to teachers, (ladies and gentlemen) only. The time will be arranged so as not to interfere with the duties of the Conference.