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THE ONTARIO TEACHER:

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No. 12.

THIRD CLASS CERTIFICATES.

-- A great loss accrues to the country by limiting the duration of Third Class Certificates to three years. It was thought by the Council of Public Instruction when this regulation was made that it would have the effect of *compelling* teachers to advance in their studies, so that at the expiration of their Third Class Certificate, they would apply for a Second. In some cases perhaps, this has been the result, but in many cases the real result has been to hand over our Public Schools, more than they ever were before, to the management of new and inexperienced teachers. Many when their Third Class Certificates expire, retire from the profession altogether, and others not any better qualified, and entirely devoid of experience, take their places, and thus without literary advantage do the same work from which others retire, whose experience was certainly worth something. Take two persons with the same grade of certificate, but give to one three years of experience, and it is quite clear that the teacher lost to the profession is the most valuable of the two. We are aware that this matter is surrounded with difficulties, and we would be the last to put in a single plea for anything like a low standard of qualification for teachers, but is it not the case that the present system does not practically keep the standard up? Let a Third Class teacher, as soon as his certificate expires in one county, pass over to another and he could teach all his lifetime without making any literary advancement. But let the law be so framed, that any teacher who has held a Third Class Certificate cannot obtain a renewal of the same unless he is able to obtain 75 per cent. of the aggregate marks assigned, and you offer him an inducement to keep up his studies, and you prevent him violating the spirit, though perhaps not the letter of the law. Besides you make the transition from a Third Class to a Second Class Certificate somewhat easier, and thus facilitate the operations of the law.

SHOULD THE COUNCIL OF PUBLIC INSTRUCTION BE CONTINUED ?

Since the appointment of a Minister of Education in lieu of a Chief Superintendent, it is reported in certain quarters that the Council of Public Instruction might be dissolved, and the whole educational machinery of the country handed over to the Minister, as so much departmental routine. We objected to the change proposed with reference to the appointment of a Minister of Education; we believe it was a mistake. We have no doubt in our own minds, but subsequent events will prove it was a mistake. We are well aware that the plea for the change *theoretically* was good enough, and that it is anomalous, where the Executive is supposed to be responsible to Parliament and the country, for any officers of the people to possess the power wielded, and the whole well and wisely wielded, by the Chief Superintendent. But the *practical* advantage of a permanent head to the Education Department—the advantage of being able to take soundings uninfluenced by the boisterous winds of party politics, was so great as to more than counterbalance any damage that might ensue from a trifling violation of well recognized theories of constitutional government.

To follow the change of the head of the Education Department by the abolition of the Council of Public Instruction, would be a serious stroke to the public mind at present, and besides being unpopular, would, what is far worse, jeopardize the Public School system of the Province. It must not be forgotten, that in making a system of education like ours effective and practical, two things are required :—1st. Good Legislation on general principles ; and 2nd, A wise filling up of details. It so happens in this case too, that the general principles are

easily defined and easily asserted, but that details constitute not only the more difficult, but also the more important duty. For instance, our whole system is based on three ideas—We must have the facilities for securing an education—these facilities must be *free* to all both rich and poor, and the people themselves must have the sole control, through the trustees, of school property, and the selection of a teacher. These three principles constitute the whole sum and substance of our Public School laws. And yet with principles so few and simple, how vast are the details. There are Regulations for Normal and Model Schools—for Inspectors of High and Public Schools—Programme of Studies—Revision or Construction of Text Books—Depositories for Maps, Books and Apparatus—the licensing and grading of teachers—and all requiring the most careful consideration and supervision. Indeed, it might be said that a failure in any one of these regulations would vitiate our whole school system.

Now, the question naturally arises, how is attention to be given to all these matters, if the Council of Public Instruction is to be abolished ? Who is sufficient for the task of managing a department as political chief, and at the same time give even the most limited attention to all the matters above referred to ? Or where can we find the man with that practical knowledge of our school system as it now exists, and the new wants which constantly arise, to impart the necessary vitality or make necessary improvements ? We know that politicians claim special fitness for any ordinary duty of government. We would not for a moment wish to detract from their merit, either real or assumed, but we do say that there is not now in the Province known to us, a

single politician with the talents or the knowledge required for discharging at the same time the duties of Minister of Education, and a Council of Public Instruction.

But, besides the impossibility of finding a suitable man for such a position, there are other matters that must not be overlooked. It is well known that our schools are founded on a strictly non-sectarian basis. The rights of all denominations are supposed to be equal. By the legislation from time to time given to the country, and the protection by the parliament, these rights are solemnly guaranteed. In the execution of the law, however, it would be an easy matter for a Chief Superintendent were he so inclined, to hold the balances of justice in such a way as to favor one class more than another. As a check to any tendency of this kind, however, the Council of Public Instruction is invaluable. Every administrative act is performed with their sanction, and the personal prejudice of one man is neutralized by the many. True, with a Minister of Education, this danger need not be so particularly guarded against, as all complaints from such causes could be fully ventilated on the floor of parliament.

There is another objection to the abolition of the Council, the force of which remains under any circumstances. It was provided in the recent amendments to the School Act, that the High School Masters, Inspectors and Public School Teachers, should be represented in the Educational Council of the Province. The reason for giving them such representation are still valid. Their practical knowledge of school

matters, and their acquaintance with the educational wants of the country, entitle them to express an opinion in such quarters as would enable them to make themselves felt, at least on the details of school government. Now, this was either a wise or unwise concession to the profession. If wise, then there can be no justification for its withdrawal, but the fact of its having been abused. Will those who favor the abolition of the Council, say the profession has abused the privilege of election? Are those men who sat, by their votes, at the Council Board a discredit either to their constituents or to the country? If not, then, why stop the operation of machinery which gives promise of producing such good results before its usefulness or efficiency has been fairly tested? Surely the teachers and inspectors on whom the franchise was conferred a few years ago, are today as worthy of confidence as then. We believe that we speak the sentiments of every teacher and inspector in Ontario, when we say that they value too highly the privilege of representation at the Council Board, to part with it readily or willingly.

Further, we urge that such a measure would be retrogressive. The tendency of all modern legislation is to widen the franchise and extend the privileges of the people. What then would be thought of a measure that would disfranchise nearly six thousand of the most intelligent voters of the Province?

We will probably refer to this question in a future issue.

SIMPLE THEORY OF FRACTIONS.

BY D. MCINTYRE, TEACHER, LANCASTER.

The chief cause of the tardiness of pupils in acquiring a competent knowledge of fractions arises from the complicated form

in which they are written, and from the fact that this complication is seldom properly explained. Were the denominators written

in words, instead of in figures, either after or below the numerators, the theory of fractions would be mastered with very little more trouble than that of whole numbers. But when the pupil meets such forms as $\frac{2}{3}$, $\frac{10}{13}$, &c., his ideas of numbers lead him to confound the terms in spite of abstract rules and definitions, and unless thoroughly enlightened, all fractional operations will long be regarded by him as mysterious and unreasonable. It is not sufficient for him to learn that "A fraction denotes one or more of the equal parts of a unit," that "the lower number is called the Denominator, and shows into how many equal parts the unit is divided," that "the upper is called the Numerator, and shows how many of such equal parts are taken to form the fraction," or that "A fraction also represents the quotient of the numerator by the denominator." These abstractions are good enough when the pupil is prepared for them; but in order to present the subject in an intelligent and simple form, his knowledge of integral numbers must be appealed to, and the relation existing between the integer and fraction must be investigated. Unity or the integer is the basis of all arithmetical calculation. Whole numbers reckon up from fractional numbers, up to this standard. In whole numbers we can tell the numerical value of any combination of figures, because we have a fixed scale of notation, and we know that any figure is increased tenfold every place it is removed to the left of a certain point, known as the decimal point, and marking the place of units. In other words, we know that ten units of any order make one of the next higher. Fractional numbers that have a decimal scale of notation, that is, fractions whose figures decrease in value tenfold, as they recede from the decimal point, may be written like whole

numbers. Thus the mixed number, $24\frac{3}{10}$, may be written 24.3 and we know from the position of these figures, that the 2 represents twenty units or two of the order of tens, the 4, four units and the 3, three units of the order of tenths. As fractions, strictly speaking, reckon up to unity, they must have a unit or standard to reckon from. The fractional unit is not fixed in value like the integral; but on the contrary its numerical value is as various as the equal parts into which unity may be divided, hence the complicated forms in which Vulgar Fractions are written. If it were customary to write integral numbers in different scales of notation, we would have to indicate the scale in which any number was written in order to know how many units of the lower order would make one of the next higher. This is exactly the case in fractions. Unity is the next higher order to all of them and, as they have different scales of notation, we have to employ the denominators to indicate how many fractional units make one of the order of integers. The fractional unit is, in every instance, one of the equal parts into which the integral unit is divided. Let the

B C

line A—————D represent unity, and let it be divided into three equal parts AB, BC and CD; each of these is one-third of the unit AD, and we may use any one of them, say AB as the fractional unit, which is therefore $\frac{1}{3}$. Any two of these parts, AC represents $\frac{2}{3}$ of AD, that is, two fractional units, three of which make the integral unit AD. Strictly speaking a fraction does not denote the quotient of the numerator by the denominator; but the number of times the quotient of unity by the denominator is reckoned, although by deduction, we know that $\frac{2}{3} = 2 \div 3$.

NOTES FROM A TEACHER'S JOURNAL.

BY WILL WRIT.

I.

Sept'r. 22.

The matter of ventilating schools is one in which more stupidity is shown than there is any excuse for. Nothing could be simpler, at least in country schools. Let the teacher observe the direction of the wind, and close the windows on the windward side, and open those on the opposite side a little from the top. This will secure a constant change of air, and at the same time prevent draughts. It has been truly said that though foul air may poison, yet a blast of cold air may slay like a sword. It is true, these directions are only applicable where there are windows on two opposite sides; but in most country schools this is the case.

There are days in spring and autumn, when, as it is said, "it is too cold to have the doors and windows open, and too warm to have fire." This is simply a contradiction of terms, for when it is too cold to have the house open, it is cold enough for fire. It is true the room may be kept comfortable without, so far as temperature is concerned; but the children breathe foul air, and are restless and troublesome; and the teacher breathes foul air and is cross and irritable. Fire is sometimes necessary for ventilation simply. The teacher who is indifferent to the proper ventilation of his school-room, ought to be indicted for manslaughter. If no arrangements are made for ventilation, make them himself, or keep at his employers till they do. "Where there's a will there's way."

II.

September 23.

The longer I teach, the more I am convinced that a great part of the time is wasted, ay, worse than wasted in our public

schools. Children are sent too young, are sent too continually, and are kept there too many hours. Consequently, school life becomes an old story, and they go to school as a mere matter of course, and without that real live interest which is essential to any valuable progress. George Macdonald has said that knowledge imparted is utterly useless without there having existed a previous desire therefor. To see how true that is, we have only to note the large numbers of youths and maidens who have gone to school unnumbered days and weeks, who have been the recipients of torrents of knowledge, which has acted upon their minds something like water upon a duck's back, and who have now as much (?) real education as if they had never gone a day.

September 27.

Children are not taught to think at home, as much as they should be. Most parents reason in this wise: "We pay our teacher to educate our children, so why should we trouble ourselves to do his work?" And they are right and wrong both. They are right in thinking that it is not fair for the teacher to inspire the children to turn the evening family circle into a school-room. I have no sympathy with those teachers who would have the lessons all prepared at home. To me it is a sad sight to see a fine boy or girl of ten, go trudging home with an armful of books that would better become a University student. It smacks of martyrdom.

But they are wrong as to what teaching really is. If they would cultivate the child's observation by calling his attention to the wonderful processes of Nature, that are daily going on around him; if they would gratify his natural thirst for knowledge by answering his childish enquiries,

instead of telling him not to ask foolish questions ; if they would do this and more of kindred nature, they would not only be doing work they had paid their teacher to do, but they would so prepare the child's mind. that the teacher's work would be doubly effective ; and in a mere pecuniary point of view they would be getting tenfold more value for their money, than if they

selfishly left all to the teacher, to "make him earn his money."

October 12.

Teachers should read more for their classes. No amount of rules, and directions how to read, can make up for the teacher's living voice.

(To be continued.)

SELECTIONS.

PHYSICAL AND MENTAL TRAINING.

In what concerns education the world is gradually falling back on the wisdom of the ancients ; is, at least, learning by experience of the evil consequences of the modern system that it is necessary to combine with its new lights what has been found salutary in other ages. It is coming to understand that in forgetting to do justice to the development of the corporeal part of our nature, a no less cruel injury is inflicted on the spiritual ; these two being so intimately connected that disregard of the first results surely to the detriment of the other. One need not be a materialist to discern this palpable fact ; and that it is well-nigh as sacred a duty to ourselves and our fellow creatures to try to preserve our bodies in healthy vigor as to cultivate and strengthen our minds ; that the welfare of the mental faculties is indeed largely dependent on proper attention being paid to the physical man. It is true that there are many examples of bright intellect and noble character triumphing as it were over weakness of body. But this proves nothing against the general rule ; rather it leads us to consider how much greater in these cases might be the work, how much more active the goodness of heart, if health were added to the other powers. But while all this is allowed in general, it is only, as we said, very gradually that people are settling down to the conviction that even during the early years of life it is all-important to attend to certain

laws which regulate the healthy growth of the physical being. It is true the days have gone by when school-children were imprisoned six days out of the seven in close rooms, and permitted one walk, one look at the sky, one fresh breath out of doors in the course of the week. But the belief is not yet thoroughly reduced to practice that a large part of each day in a child's first years should be spent, amid the sights and sounds of nature, in free, joyous country air—open air at least when the country is out of reach. Not blindly has nature always made it the first delight of childhood to run about in the sunshine. We may call it a remnant of barbarian habits, if we please, but it is a necessary remnant. It is one of the most irrational and most fatal mistakes into which modern civilization has fallen to imagine that what is miscalled "rude" health is undesirable, incompatible almost with refinement and elegance : so that numbers are content to shut themselves off from the greatest of material blessings, that state of highest bodily health and vigor which makes active employment a pleasure, not an effort, with the idea, forsooth, that it benefits only those who belong to the lower classes. Is this what we come to when the necessity for manual labor, for labor of any kind, is withdrawn ? Can the active hearts and busy brains of mankind ever perform their part duly unsupported by bodily strength ? Do ease and competence absolve from the

duty of work—work for others, if not for ourselves—work which to be worthily done still calls for physical as well as mental strength.

What is more obvious than that in the first precious years of existence, comparatively free as they are from duties and trials, and appointed as it were for the sole purpose of outward and inward growth, every means should be used for rendering that growth strong and symmetrical? Children who breathe most constantly the fresh, pure air of heaven, who are most interested in out-of-door amusements and exercises, whose minds are employed on the living objects of nature and the wholesome useful knowledge which comes from observing them, gather thereby stores of energy that will help them to the comfortable and creditable fulfilment of whatever work falls to their share in later life.

All parents take delight in affording children such amusements as suit their age and taste; nay, when the taste does not agree with the age, nine times out of ten it is still allowed its way. Often it is hard to believe in hurtful consequences, doubly hard to resist pleading eyes and persuasive tones. But what becomes of physical education when boys and girls of twelve and fourteen, and even younger ones, are permitted to be up all night at parties, prematurely aping their elders in much that is little worthy of imitation, and this not once or twice, but frequently? Some people, sensible people too, argue that it is only by means of early association that the shyness and diffidence which are fostered by seclusion can be rubbed off in time to admit of young men and women acquiring the ease of manner and self-possession without which they can neither enjoy nor adorn general society. There is some truth in this. Girls and boys should assemble for common enjoyment occasionally, but not at night, not when mind and body ought to be at perfect rest. We may moralize indefinitely, and go on repeating to them forever the sad story of *La Feune Espannoie*; they may yet get by heart how "*Elle aimait trop le bal*," and what evil came of it; but we can not teach them to sacrifice without a pang the pleasure of the moment to the good of the future; not, at any rate, till we ourselves return to the simplicity of our fathers, and take our so-

cial amusement by day-light and in the early evening.

Young ladies and gentlemen who read the pages of *Home and School*, and to whom these words in particular are not especially addressed, but who may nevertheless glance at them, let us make our peace with you. We would no more keep you from dancing than we would stop the singing of the birds; but, if you will remark, *young birds do not sing at night; those that do, sing for the benefit of their voices or to put their children to sleep.*

Nothing is more wretched in its effects than the system of repression to which some poor children are subjected, whereby they become a prey to the small proprieties of life, and can not shake off the incubus of perpetual fault-finding and correction. It is a cruel mistake to burden a child's mind with a thousand minute rules and standing orders; it is far better for him to go wrong sometimes than to be hampered and kept from ever thinking for himself. An impetuous child will often forget and incur the blame of disobedience till he gets hardened to it; an obstinate child will rebel and become irritable; while a conscientious one grows morbid and joyless under the pressure of constant restriction. We should remember that many little things which it is requisite for a child to learn it catches much more easily from the ways and habits of those it lives among, the atmosphere that surrounds it, than from oft-repeated verbal orders and directions.

If we believe that the whole of life is an education, that from first to last it is meant to be ever a progress from lower to higher, we will not complain that with all our pains we can not fashion grown-up children, can not inspire them with the tastes nor fit them for the enjoyments that belong naturally to riper years; rather we must rejoice that the child should be still but the child, and youth only youth, else they would weary of life before the journey were half over. As it is, how often do we see the young preyed upon by a listless *ennui*, which is the more intolerable for the feeling that it ought to have no existence, that it need have none. Consciously or unconsciously, the young intelligence needs some special occupation on which to concentrate its energy and ambition, and nothing will permanently satisfy it which does not call these forth and keep

them alive. In a boy this restlessness is usually quieted if not wholly cured by the choice of a profession and preparation for it; but with girls the case is different. Yet many of them suffer greatly for want of an engrossing pursuit which would keep them from feeling that life is an empty and unprofitable thing. And it is this want quite as much as any less pardonable desire that has of late years swelled the ranks of the woman's rights party. Is not this a result of defective education? In this stirring age the force of example is too strong for many to be content to sit with folded hands; and there is still mischief for the "idle hands to do." Surely there is work for all in this "God's fair task-garden"—work for each, according to his or her capacity—work that each may learn to do well, and ever better, and that each may well be content to make his life's work.

But to those who are very young, who are still only *thinking* of life, not actors in it, the special work set for them is not always plain. May we not oftener than we do direct them to it, or at least help them to make use of the time until it declares itself? In the education of girls as well as of boys it is good to bend their energies to the attainment of excellence in a particular branch of study—in language, art, or science, or in things of more practical daily use than any of these. Even in the attempt to obtain the mastery of any worthy subject there is infinite benefit, and when it comes to be pursued with ardor it opens the mind to much that otherwise would never have dawned on the understanding. Then what a weapon of defence may it oftentimes become in the varying and shifting fortunes of life! A means of livelihood and independence; no longer only an interest and ornament.

So much is undoubtedly to be learned from books, that we are perpetually in danger of forgetting, that a very large and very important part of mental training is not to be had from them. It is so much easier to put an instructive book into a child's hands than to exert ourselves for his improvement that we readily come to believe that a book is his best guide. But this is not unfrequently a mistake. A young mind continually poring over books is apt to grow one-sided, impassive, and simply receptive; besides that, there is much practi-

cal knowledge that is no more to be had from reading books, than one can become a good cook by simply learning recipes by heart.

That part of education which is acquired from school-books is doubtless essential to train the faculties and give accuracy to the memory; but far more influential in giving tone to the mind, in expanding the intellect, in awakening the heart and ripening the taste, are the books, if well chosen, that are read and studied out of school-hours; and in proportion to this possible benefit is the corresponding injury when the well-springs of pure knowledge are forsaken for the polluting waters of unsound morality that are of such easy access; when, instead of offering to the perusal of the young the elevating and ennobling works of the best authors in every branch of literature, we leave them to imbibe the trash and flippancy that abound in many books not unattractive to the immature understanding.

Especial care should be taken not only as to the moral tone of books, but that they are written in good, pure English, if we are recommending them to children. We are told that language is progressive, and this is frequently taken as license for all manner of slang and imperfect grammar. Like all things human, language is subject to changes, but these changes are not always in the direction of *progress*. The progressive quality of language, in the sense of improvement, can only be marked by comparing long periods in its history.

As refined and ready and graceful speech is after all one of the first and surest signs of a thoroughly good education, as its easy exercise is itself a delight and deficiency in it a bar to much that is enjoyable in life, great attention should be paid to it. Sweet and musical voices are a gift of nature beyond the reach of mere acquirement, but there remains a vast difference between the well modulated and varying expressiveness of tones that follow as it were the meaning of the uttered words and those which are untrained and uncouth. The manner of speaking is second only to the language used; and we all know how important the early cultivation of that is, little as it is insisted on.

Many strictures have been passed on the practice of spending time and money uselessly and with poor result, as it is said, on

accomplishments which are seldom really mastered, which afford but little pleasure to any one, and are generally given up a few years after school-days are over. Yet there are few who will not acknowledge that where a child shows talent, or even aptitude for music, drawing, or languages, a wrong would be done if no opportunity were allowed of cultivating it; for a fruitful source of pleasure and improvement would be lost. At the same time those who know most of the subject are aware that it is often only after the first drudgery has been gone through that decided talent declares itself, while there are certain parts of these studies that are best acquired in extreme youth, and also that in these things, as in many others, a latent capacity is sometimes developed. It is quite true, however, that ambition may be carried too far; that more should not be undertaken than there is time to learn well and thoroughly. Yet as regards languages at least we have to remember how much light they throw on one another; how much the study of one aids in the acquirement of others; then too there is the ultimate benefit of a different sort to be derived from being able to read the books of many of the best authors in their own tongues.

Great war is waged on the "dead languages" as a necessary part of a boy's education. It is argued with much reason that boys should be taught that which is most certain to be useful to them in the struggle of after-life: that the majority of boys

never open their classics when the compulsory learning of them is at an end; and that even in the matter of training the mind to thought and study there are many better aids than this old-world literature. Let all this be true, yet will it remain true, also that if we put away from us even the present amount of familiarity with the heroic images and beautiful thoughts of antiquity, we sustain a loss that nothing will compensate for; that there is a class, a rapidly increasing one in this age, who are spared the necessity of earning their bread, and that the world demands from them contributions to its wealth of a different kind. To that class it looks for its advance in culture, in refinement and enlightenment—a class which, recognizing the wisdom and beauty contained in the old books, will never let them die out of the memories of men, but continue to believe in the duty of teaching the words of Homer and Aeschylus, of Cicero and Tacitus.

We have wandered to a somewhat distant part of our subject. Let us end it with the beautiful words of one of the teachers: "The great law of culture is, let each become all that he was created capable of being; expand, if possible, to his full growth; resisting all impediments, casting off all foreign, especially all noxious adhesions; and show himself at length in his own shape and stature, be these what they may. There is no uniform standard of excellence either in physical or spiritual nature."—*Hearth and Home.*

GOVERNMENT AND DISCIPLINE.

In all the rules and methods of discipline employed, the true object of discipline should steadily be kept in view; namely, to train the pupils so that they may form right habits.

Firmness, vigilance, and uniformity in dealing with children, are of the first importance. The teacher should never resort to violent means, as pushing, pulling, or shaking the children, in order to obtain their attention. All such practices constitute a kind of corporal punishment which, whether that species of coercion be permit-

ted or not, should be most carefully avoided.

Modes of punishment especially painful to the corporeal system, such as the sustaining of wearisome, unnatural and long continued attitudes of restraint, standing, kneeling, etc., are exceedingly wrongful and injurious. Equally so is the confining of delinquents by trying them or by shutting them in closets. These are all a resort to mere physical force instead of moral incentives, and involve no appeal to a sense of honor or duty in a child. They do not

properly assert the authority of the teacher, nor do they really produce obedience on the part of the pupil.

When corporal punishment is resorted to, it should be of a proper character—never partaking of that continuous infliction of pain which we denominate torture and never administered except in a spirit of mildness, and with deep regret at its necessity. When all those persuasive incentives and agencies which constitute moral suasion have been appealed to without avail, and there is no other resource, corporal punishment may be resorted to in order to save the pupil, but for no other reason. The necessities of discipline may seem to require it, and they certainly do, if in order to meet them the teacher must choose between chastising his pupil thus or depriving him of the benefits of school instruction and training, and so insuring his moral destruction.

In directing the various movements required of the pupils, care should be taken never to touch them. The teacher ought to take such a position before the class as will command the eye of every pupil, and hence direct by the voice or by a signal. Pupils must be habituated to the impression that the teacher will give his commands but once, and that they must be obeyed at once.

Harsh tones of the voice are unnecessary and improper. Words of disapprobation may be uttered by the teacher in a tone of decision, without the use of any severity that would imply resentment, anger, or antipathy on the part of the teacher. On the contrary, the language used and the tones of the voice should always express a feeling of sympathy with the child. This is the way to win the youthful mind, and to bend the will, through the affections. A different course will antagonize it and prevent all real submission, securing only a temporary semblance of obedience.

“As the teacher, so will be the school.” It is, therefore, requisite that teachers should rigidly discipline themselves, by carefully cultivating habits of neatness, cleanliness and order, gentleness of manner, a watchful self-control, and a cheerful spirit. In speaking, let the rising inflection of the voice prevail; then the falling inflection of reproof will be more effectual and impressive.

Teachers should seek to obtain the sympathetic regard of the children by giving due attention to their little wants and requests, which should be fulfilled as far as may be proper and reasonable. Children are quick to perceive and resent injury or injustice. The child who asks for the privilege of a drink of water, for instance, may be suffering acutely; and if not accorded relief, when this seems to be perfectly practicable on the part of the teacher, feels a sense of outrage which, for a time, if not permanently, impairs its respect and regard for the teacher. The cultivation of a due feeling of sympathy for the children will wholly prevent this. The possession of this feeling in its fullness is the best foundation for success in both discipline and instruction.

Encouragement inspires confidence; and children, more than others, need it. Let it be given, in all cases where this can be honestly done. To a want of this in the discipline of classes are to be ascribed the timidity and reserve so often manifested among pupils by a hesitating manner, a low voice, and a tone of inquiry in response, especially to strangers. A proper degree of encouragement renders them confident and spirited, eager to tell what they know and in an audible tone of voice. Encouragement has a peculiar influence in promoting both mental and moral improvement.

Public exposures and badges of disgrace belong to a class of punishments which, if ever resorted to, should be employed under careful limitation, and with great circumspection and prudence; for it requires a skilful, discreet, and conscientious teacher to use them safely and with benefit. In the discipline of girls, they should be avoided altogether, as destructive of that nice sense of shame and delicate sensibility to reputation which are to be most carefully fostered in the female character.

Cleanliness, method, and regularity are among the first and most necessary elements of popular education. Every rule requisite to maintain or impart these should be punctiliously and diligently enforced.

Education is unfinished until the physical powers come under subjection to the understanding and the dictates of morality and social refinement. Children should be taught how to sit, to stand, to move, to walk. Rules are required for this; but they need

to be only few and simple, and the nice and watchful observation of children renders it quite easy to enforce them, provided they are not capriciously applied. Children must first be taught them, and then never permitted to violate them without admonition or correction.

Teachers should never forget that their pupils are closely and constantly watching their conduct, and that they are prone to imitate whatever they observe. They should, therefore, see nothing that they may not safely imitate. There is an "unconscious tuition," the silent influence of which produces the most permanent effects.

The character of children is greatly affected by their surroundings. These, should, therefore, be neat and orderly. The rooms in which they assemble should be clean, the desks and other furniture, so far as possible, without injury or defacement, and everything giving evidence of punctilious and constant attention. Children, from the contemplation of these things, unconsciously acquire habits of order, neatness, and regularity, which have important bearing upon their usefulness and happiness in after life.

The basis of good order is attention. It does not require that the pupils should occupy, for any certain time, a fixed position; that they should be compelled to restrain their glances upon a given point; that they should be motionless as statues. All this is unnatural; and whatever is unnatural is disorderly. The postures should be graceful, easy, and uniform, but should be frequently changed. The movements, while as simultaneous as perfect attention would necessarily produce, should also be easy and natural.

Good order involves impression rather than repression: it does not consist in a coercion from which result merely silence and a vacant gaze of painful restraint; but it results from the steady action of awakened and interested intellect—the kindling of an earnest purpose and an ambition to excel. Hence by making punishment the

first instead of the last resort, the true object of educational discipline is defeated. The prevailing atmosphere of the class-room should be always that of love and kindness, equal to that of a parent, in whose place indeed the teacher is for the time; and it will be found almost invariably that everything essential to effective discipline springs from an interchange of confidence and regard between teachers and the pupils committed to their instruction.

Those who have the management and instruction of our schools should exercise the greatest care that their teachings and influence be not exclusively intellectual,—that they tend not only to inform the mind, but to form the character,—filling the head, but impressing likewise the heart. Even where the operations of these schools are confined to teaching, let the kind of knowledge, and the mode of imparting it be dictated by considerations having in view moral and religious, as well as intellectual improvement. Let the knowledge imparted be always such as will refine, ennoble, elevate. When scientific truth is presented, let the pupil be led to look not simply at nature, but "through nature up to nature's God"; let him learn the laws and phenomena of the physical universe in the spirit of the Psalmist as he exclaimed, "When I consider the heavens, the work of thy fingers, the moon and the stars which thou hast ordained, what is man, that thou regardest him?" Thus may instruction in every class and grade be made effectual, without the dogmatic teaching of sectarian tenets, in subserving and promoting the best interests of its pupils, both temporal and eternal. Any scope or intention short of this would certainly be inconsistent with the intelligence as well as the moral and religious character of our age and country, and must render our common school education, as a means of fostering and supporting the free institutions of our republic, unworthy support or vindication.—From "How to Teach," by Supt. N. A. Calkins.

SCHOOL CRITICISM.

We often hear the sad-hearted teacher say, "I would dearly love to teach, did not the children so sorely try me. But I have labored and studied and struggled to improve their ways, only still to see them full of faults." My purpose is to say to my fellow-teachers that the "faults" are exactly what you want. Your opportunity subsists in your children's foibles and imperfections. If pupils had none of these, you could have no field of labor. You are in the school-room for the purpose of dealing with frailties; and the whole of your study, professionally considered, is with the view of treating successfully such moral and intellectual deformities as possess the children.

Instead, then, of pining under the unpromising prospect of the teacher's lot, enter as bravely into the sternest phases of your duty as though, in the soldiers' columns, you were facing shot and saber. You are thus, by your circumstances, in the highest and best sense of the word a critic. Your field is your glory. You have the best possible opportunity to see the children's errors and to study for their correction.

But criticism is more than fault-finding. The excellent critic is the skillful analyzer, who can discern the differences between faults and graces, and who can so display the same as to make others see them. There is a lesson in every affair of the school, and the master critic is he who is able to find it.

There are two methods in current use, whose benefits are small unless the two are combined. There are hobbyists on both sides, who are effective inversely as they indulge their notions. The one method is to do all the criticizing yourself, in order that it may be well done: the other is to delegate it all to their pupils, in order to stimulate their minds as well as to sharpen their observation. These reasons are both excellent, and since they support opposite positions, each should be received with allowance for the other. By carefully observing the workings of either plan alone, serious objections will suggest themselves.

1. The work should be well done; so the teacher should be responsible for every correction.

2. The class should be intent upon the exercise; so everyone should have part in the discussion of a fault.

But when the patient teacher, unwilling to risk his cause with another, faithfully observes each error and administers its treatment, he takes upon himself too much work. Jethro said to his son-in-law, Moses, "The thing that thou doest is not good. Thou wilt surely wear away, both thou and the people that is with thee; for this thing is too heavy for thee." Moses had simply been sitting on a judgment seat from morning to evening, trying to judge the people. He had been weighing matters which could have been determined by other men. Jethro advised him to establish ordinances (by-laws), and appoint men for their administration, reserving to himself only the "great matters." There is a world of wisdom in this. It is the foundation principle of political economy.

One of the rarest attainments in the teacher's scope is the art of economizing time and force. You cannot afford to lose a moment of the one or an ounce of the other. In the six hours of a school day you must attend to the several branches or be untrue to your duty. Many of these must be so sub-divided that in the possible classification you will fall short of time. So by doing all there is to do in the field of criticism, you consume the most precious boon. And the labor of attending to the minutest details of the school machinery is that of an intellectual Hercules. "Thou wilt surely wear away, both thou and this people."

But there is danger, on the other hand, in the second method. Teachers who ignore the children's faults, accepting such construction as other children will put upon them, take on too little work. The young critic will often be sharp and impress his classmate, when he himself is wrong. Or, what is worse, he may make no impression at all. Little feuds may be nurtured in this way, classmates seeking this as the best opportunity for venting malicious feeling.

The remedy for all these tendencies is in the teacher's watch-care. He is a critic-in-chief whose decision must be final. It is his place to see that the children's criticisms

do impress the erring. What is a suggestion worth, even though faultless in itself, unless understood? It should be understood and reduced to practice.

So, to sum up, both methods are good when judiciously combined; but, taken separately, they become extremes. I like to encourage criticism in the class, since it aids me in securing attention, and since the clash of minds is a powerful tonic. I would therefore recommend you to follow some method of inter criticism. But in giving this field to the children, do not surrender your own commission. It is for you to direct it and keep it in check. Children grow fond of it, and, if unrestrained, will abuse its privileges. It is also for you to sift out chaff, and teach pupils what to do with the grain. The use of the grain is the practical problem of life. Criticize for a purpose. Reach that purpose in every instance. Unless a fault be worth correction it should never, under any circumstances, be named.

The purpose or object of criticizing a fault is to secure its correction. Of what use it is to tell a child he reads too rapidly unless the telling induce him to moderate his speed?

What, then, is the teachers's part, after some classmate has pointed out the pernicious fault? First, let him be sure the complaint is well-founded; then let him test its effect by a second trial, and, if necessary, a third and fourth. On this second trial he should not allow other matters to be criticized, since the sole object of giving it was to correct a faulty rate. It is wise to concentrate the mental effort upon the rate until it is corrected, after that some other error may be considered. Reading is thus criticised as an intellectual product. Attention, thought, study—these are the essentials of a recitation; and the teacher who can secure them is the master of the situation.—*Prof. W. S. Smith in Michigan Teacher.*

PESTALOZZI.

The man who personifies most justly the great pedagogic revolution is the immortal Pestalozzi. Fichte, in his address to the German nation, presented as the regenerated school of his race the system of this saint. And, in fact, none else has so distinguished the individual faculties which predominate at each age, or has seen so clearly the shortest road to arrive at these faculties, to increase them in daily exercise, and enlighten them with the current of science. If, when sentiment predominates in man, at the age when he is attached to nature and home, you educate the intelligence; if when, as in youth, the fancy predominates, while the fervor of the blood and the restlessness of the spirit lead him to passion and combat, in opposition to everything that surrounds him, from the necessity of creating a world of his own—if at this critical time you educate the reason, and when the age of reason arrives, and with it often the bitter fruits of life, when the flowers are dried and the butterflies have ceased to flutter around them, if you strive to educate the sentiments and

the imagination, you will make of the man an artificial being without succeeding in subjugating the inaccessible, unteachable, mysterious nature. As fruits are first seed, germ, and flower, ideas must be sensations and notions before arriving at their absolute unconditionally. And if you educate in the child—the child, and not the man—the faculties of the child by symbols within his reach, by narrative which please and refresh him, you plant in his individual soul with certainty the germs of the human soul.

Who is it that truly educates the child in humanity, and possesses this divine ministry? The mother. She is the prophetess who foresees the future life, the sibyl who sounds the mysteries of the spirit, the muse who brings to the heart human inspiration, the sorceress who fills with sweet and pious legends all our fancy, the priestess who raises the conscience to the regions of infinity. From the moment when she feels her child beneath her heart, it appears as if spirit and nature revealed themselves to her mind to assist her in her divine office,

and thus she appropriates all ideas to the child, as the bird weaves all the rustic objects gathered in the fields to form the soft nest of her beloved offspring. The mother knows instinctively the laws of health by which to preserve her child from the inclemencies of the world, the medicine with which to treat its constant infirmities, the morality which is to sustain it in its future struggles, the literature which is to embellish its days, the religion which is to convert it into a being superior to all others of nature and to bear it to the bosom of the Infinite. All the child needs in its early years the mother bears in her intelligence, as she bears in her breast its only nourishment. Let us make of the school a mother. This is the thought of Pestalozzi

An Italian by race-descent, his warm soul contained the contrasts of the Italian soil in the Alps, where the ferns of the North were mingled with the orange blos-

soms of the South. German in his intellectual culture, and in his German birth-place, Zurich; republican by birth and conviction, a revolutionist and a reformer, always at war with the privileges of the aristocracy and always devotedly attached to the principle of human equality; reared by a loving mother, at whose side his infancy was passed and who infused in him a part of her delicate feminine soul; married in early life to an heiress whom he had ruined in works of charity and benevolence; sustained in his adversity by two old servants of his father's house, who loved him like mothers—this reformer went from town to town seeking out the ignorant and poor, educating and supporting them, adopting orphans, begging, if it were necessary, for means to feed the hungry; the philosopher of action, the poet of life, the tribune of infancy, the divine and immortal child of nature.—*E. Castelar in Harper's Magazine.*

ON TEACHING HISTORY.

How *teach* history? Convert the question thus: How *learn* history? You cannot teach what you have not learned. How did you learn history? The question of teaching may always be viewed from the other point, of learning. Allow for the difference between the adult and the child, and for the special peculiarities of different minds, use in teaching whatever you find to have helped you, or anybody else.

Where there is a man there is method. Each must have his own way of teaching, of learning. There is no *best* way. All ways are good, if they are truly ways, not blind paths or mazes. Novelty is desirable: it is impressive. Pupils revere reserved power: they cannot see it in a uniformity of action. Never let them have reason to think they know all your tricks and your manners: be ready to pounce upon them with wise surprise: seek out many inventions.

Teaching is helping to learn: it is never hearing recitations, or the citing back to present memory something always learned. If the lesson is learned, you cannot teach it: you can only ask it re-cited, called up

once more. Some of the best teachers tend to defect in hearing recitations, using too much time in teaching; but those who only hear recitations never teach. Be not an Egyptian task-master, asking bricks for which you have not furnished straw. The Lockian maxim, "Nihil est in intellectu quod non prius fuis in sensu," shall be true for us so far: "there can be claimed of the pupil only what has been put within his reach."

The teacher's work, like charity, begins at home. He must cultivate himself. If he will fill the cups of the thirsty he must himself be a living fountain. He must read other history than his text-book; no man can *teach* history from a single book. He must gather from all available sources facts, anecdotes, illustrations of every kind. In newspapers and magazines of the day he will find frequently just what he can remember he needed.

Study thoroughly geography, both physical and descriptive, even local or topographical. The influence of geography on history is great and important. The first lessons I give my classes orally, on begin-

ning the study, direct their attention to the influences of climate, soil, mountains, coasts, seas, and rivers.

In teaching there is just one thing that I *always* do. Often when I give out the lesson I run over it with comments; but *always*, on taking my place before the class, my first words are: "Have you any question upon the lesson?" If no question comes up, I often say: "You have not studied this lesson; I know there are things in it that you ought to ask me about; there is one line I know some of you do not understand." A free conversation is the first part of the lesson.

I use the blackboard as much, I think, as I should for teaching in arithmetic. Whenever I can I illustrate the lesson by a map hastily drawn, a mere rough outline: I fear most teachers would not be willing to draw such mere diagrams as I make for maps; but I regard merely the purpose, which is not minute accuracy of coast or location, but relative position of a few points. For Asia Minor, an oblong, with rounded corners, is good enough. All sorts of diagrams are to be sought out and given; genealogies should be sketched in the usual form, where successions are influenced by relationship.

Learning dates is the great bugbear of history. I think it hugely overdone. A pupil that can in general history carry forty of them does well, if they are the pivotal ones. I find that I assign my classes twenty-three dates in all history prior to 800 A. D., and about some of these I am not strenuous; but in going over the history of any country I tell them that this and this are important in that special history. I cannot praise the method of Prof. Labberton, which requires the learning of 511 dates directly, and probably as many more incidentally. There are so many good things in the "Outlines" that I like to praise the book, if not the method. But to the learning of the succession of epochs, or of periods of history there is no objection, except that it may be made too minute; otherwise it is an admirable method, and should be largely used in reviews.

I am sorry to say that the state of civilization in our country is still so low that a large share of the instructors who have pupils in history (I cannot call them teachers) require or allow verbatim recitation, indicates ignorance of the subject of the

lesson. The pupils who has made the substance of the matter his own, will find words of his own, and tell the story in his own way. But the power of truly learning is disused and lost in this way. The effort of the mind is to commit to memory, not to appropriate material; and pupils so trained can only with difficulty be brought to take any general views, or to take abstracts or synoptical statements of subjects or epochs of history. They are degraded into drudges; and the girl whom some misguided and misguiding woman has deemed her best pupil in history, I am tormented with for a year, sometimes hopeless endeavor to get her to think, and to leave the treadmill wherein she walks her weary daily round.

Do you ask what shall be done with the contradictions of historians? Recognize them promptly, fully, unshrinkingly, even boldly. Show your pupils that in early times there were no records, or that records were under the influence of ignorance and prejudice, of national pride or the vanity of rulers; that mythical stories of Troy and Argonauts and Hercules prove nothing at all about history; that they are Jack-the-Giant-Killer tales; but there is much in history indisputable as to fact, and that the greatest difficulty is to decide upon the character and purpose of individuals. If you understand these things well yourself you can show why the Pocahontas story is false; why early Roman history is fictitious; how men discriminate between the certainly false, the probably false, the probably true, and the surely true.

I am accustomed to place before my pupils both sides of disputed questions, and to leave them to decide for themselves. Their education should constantly train them to the art of selecting reasons and judgments; and no branch is more favorable to this work than history, unless, indeed, the study of language may take precedence. I desire to make them skeptical of doubtful evidence in all things; I equally desire to make them ready to believe on reasonable evidence; to reject Rollin as trash; to learn from Arnold how to think.

Let history be in your hands the story of the development of the human race from its fierce ages of war and plunder, its Assyrian epoch, to modern civilization, point to the higher elevations beyond. Let

it show as a vast panorama the nobility and grandeur of truth and justice and righteousness; let it be living, earnest, given from a warm heart and enlightened brain. You are sowing seed; if it be not mouldy, shrunken, dried, baked, lifeless, you may hope that there shall some of it fall in good ground and bear fruit, some thirty, some sixty, and some an hundred fold.—*Dr. Willard, in Chicago Teacher.*

A DOMINIE'S TALK WITH HIS PUPILS.

THE EXTENT AND CONFIGURATION OF THE STARRY UNIVERSE.

"Our talk to-day," said the dominie, "will carry us into a subject on which much has been attempted and much conjectured, yet little learned. It is probable that these conjectures date as far back as the days of the patriarch Job, who, in the magnificent poem which bears his name, speaks repeatedly of Arcturus, Orion, and the Pleiades, or 'Seven Stars,' under the ancient names of *Ash, Keel, and Kimah.*

"No doubt Job and other wise men of his day believed, as all do now who allow their faith to follow the lead of their sight, that the earth is a solid, immovable center, around which the sun, moon, and stars daily revolve. And so natural is this idea of our *centrality* that it is scarcely possible even for an astronomer, however veteran, to look up on a starry night to 'the spangled heavens,' and see them

—in solemn silence all

Move round this dark terrestrial ball,

without mentally asking the question, 'Do not these stars crowd the great concave in every direction? Do they not enwrap us, as it were, in a garment of light? We are certainly not on their *outskirts*. Must we not of necessity therefore be in their centre, or very near it?'

"To answer this question it is necessary that some one study the configuration and, if possible, the extent of the starry universe, and gather for our guidance some reliable data. Until within the last hundred years no one seems to have made so much as an attempt at this study; and this neglect arose, not so much from a lack of interest in the subject as from a lack of any reliable plan by which the star-depths might be sounded.

"About one hundred years ago, or a

little later, the great English astronomer, Sir Wm. Herschel, a German by birth, conceived a plan by which this grand problem might be attacked, if not mastered. For this purpose he was furnished with the most powerful telescope then in existence—a telescope whose light-gathering power was equal to that of a human eye in which the pupil had been dilated from one-eighth of an inch to eighteen inches diameter. With this enormous increase of the power of vision he began, in the year 1784, to sweep the whole heavens in successive zones, about as wide as four times the apparent diameter of the moon, counting in each zone and recording as exactly as possible all the stars visible in the fields of view. The rule by which he guided himself was this: Assuming that the stars, like trees in a forest, are scattered throughout space with a fair degree of uniformity both as to position and magnitude, and that the brighter and seemingly larger stars are less distant than those which are faint, and that his telescope was powerful enough to reach the boundary of that system of stars of which our sun was supposed to be a member, he thought that by counting and recording the number of stars in each portion of the sky he might be able to determine the portion in which the star-stratum was thinnest, and in which we are therefore nearest the boundary, just as a person in a moderate and thinly-wooded forest may judge its boundary to be nearest on that side where fewest trees are to be seen.

"Sir Wm. Herschel had not proceeded far in these sublime labors before he made some unexpected and surprising discoveries, as I informed you in our last talk, which for a time diverted him from his main purpose, and which at the same time con-

vinced him that the rule on which he had been laboring was unreliable, for the reason that the stars are not distributed with any assignable uniformity through space, nor is their apparent magnitude any criterion of their relative distances.

"He then adopted another plan, on which he labored for many years, and by which he once more swept the heavens, zone by zone, as before, only in the last case, instead of confining himself, as he had done on principle, to one telescope, and counting the number of stars through it, he now used several telescopes of different degrees of power of penetrating into space, and made a careful record of the reports given to him by each

"His huge labors, extending through forty-two years (from 1780 to 1822), and devoted mainly to the endeavor to gain reliable information as to the extent and configuration of this starry universe, revealed to him many new and wonderful facts, but brought him very little if any nearer a satisfactory answer to his original inquiry. Some of these discoveries I will try to explain to you, but before doing so will have to say a word or two about a certain portion of the heavens which awakened his deepest interest, and that was the Milky Way. "And now," said the dominie, pausing and looking over his company of eager listeners, "who of you boys can tell me anything of the Milky Way?"

Many hands were raised, but the eyes of most were directed to Walter Branham, the oldest of the company, evidently desiring him to answer for them.

"It is a long, irregular, whitish-looking belt or cloud," he said, "that we may see any clear night spanning the whole sky."

"It always looked to me," said Johnny Pratt, "as if it were the place where the comets get their tails."

The dominie smiled as little Willie Jones added, "Or else the place where the comets rub off their tails, and leave them lying loose."

"I have heard country people say," Alf Arnold quizzically remarked, "that the milk-maids used once to travel that way, and that they stained it with their milk. But I never could learn how they managed to get there."

"Your answers all show that you know what I mean," the dominie rejoined. "The

Milky Way, as we call it in English, or *Via Lactea*, as it is called in Latin, or the *Galaxy*, if we use the Greek word meaning the same thing, is a broad belt of faint light like that of comets' tails, irregularly encompassing the whole heavens, partly double or mottled here and there with spots much brighter than the rest. When Sir Wm. Herschel turned his giant telescope upon the Milky Way it was no longer a cloud, nor was it faintly luminous, but it was by far the most glorious part of the heavens. Its soft white light was resolved into a countless multitude of stars, each too small to be discerned by the naked eye, except when hundreds and thousands blended their individual rays together and shone by a combined and therefore confused light. The first revelation made by his grand telescope was that the Milky Way is a brilliant *sheet of stars*.

"Another revelation was that, although the stars in the Milky Way were generally distributed with a fair degree of uniformity, they were in other parts crowded together or separated from each other in a remarkable manner. Occasionally there were starless spots, looking like holes in the bright concave, through which he could look to the utmost bounds of the universe, yet not see a star. At other times, as the heavens revolved slowly before the field of his telescope, the stars would number many thousands to the hour, and in one case as many as fifty thousand. Indeed in one solitary little white spot, not one-tenth the diameter of the moon to the naked eye, but which his telescope magnified to the size of many times the moon's diameter, he calculated that there were at least twenty thousand stars visible at one view.

"Another fact revealed was that some of these star-clusters were probably *systems*, bound together by some natural law of aggregation. Not that they were *binaries*, as described in our last talk, in which a pair of stars revolved around each other; nor double nor triple binaries, in which several pairs revolving thus around each other revolved also in pairs around a point central to the group; but that they were collections of stars, by hundreds and thousands, in round forms, either globular or disk-like, and having in some cases a starless space between them and other clusters as if the mass of material constituting each cluster

had been drawn away by gravitative attraction from the masses of material constituting other clusters, and of course were governed by the laws of attraction and revolution pervading all other systems of matter in space.

"Another class of facts greatly perplexed him, and has not in all cases been satisfactorily settled to this day. Besides these star clusters, he saw many little spots of shining white, which appeared through the telescope much as those other shining white spots appear to the naked eye, which are resolved by the telescope into multitudes of stars. These spots were of all imaginable shapes. For the most part they are round or oval, though some are lenticular, or lens-shaped, and others annular, or like a stout finger-ring; one is crab-like in appearance, another like an hour-glass, and others of forms that have no likeness in nature.

"The great observer from whom we gather most of these facts, and whose opinion in such matters has been proved to be in most cases astonishingly correct, supposed these last-described appearances in the heavens might be interpreted in either of three ways; first, these shining spots were only what they appeared to be, *star-cloudlets*, composed of a thin luminous mist, or as he and others called it, *star-dust*; or second, that, like many other such spots visible to the eye or to a feeble glass as clouds, but resolved into stars by a telescope of sufficient power, these shining spots only await a stronger glass to be also resolved into stars; or third, that they may be distant *Milky Ways*, like our own, but far outside of ours, and composed of millions and millions of stars whose combined light is barely sufficient to reach us through the interminable distance.

"I mention these facts to show that the greatest possible care and attention have been given to these observations by men most reliable for wisdom and truth. I must also say now that since Sir Wm. Herschel's day these mysterious spots have been examined by telescopes of vastly increased powers, and also by other means than the telescope, and that most of them have been proved to be star-clusters, while others have been as clearly proved to be nothing but star-mist or star-dust, or *nebulæ*, as astronomers call them; and others still seem to be

a singular compound of solid masses intermingled with luminous mist."

Just here the dominie observed that several faces assumed an expression of inquiry. He paused a moment; then said, "Speak out, boys. I think I know what you wish to ask; but let us all hear the question, that all may hear the answer too."

"You said just now," replied Walter Branham, speaking for the rest, "that some of these spots are 'proved to be nothing but shining mist.' How could this be proved?"

"I was about to tell you," the dominie answered, "that I would explain this more fully in our next talk, when we inquire into the *constitution of the starry universe*, or the materials of which it is composed. Can you wait till then, or shall I tell you now?"

"Wait! wait!" was the unanimous response.

"Thank you," said the dominie. "You must take the statement on trust; but I think the proof of it is perfect.

"I have not much more to say on the subject to-day, except merely to bring all things to a point. As for the *extent of the starry universe*, you may yourself judge, from the facts given, that it is beyond all measuring, and even beyond all conjecturing. Its limits are pushed visibly farther and farther away with every increase of telescopic power. Indeed we can not be sure that it has any boundary; for, as it has been remarked by a celebrated lecturer on the heavens, 'The only question for us is between an infinity of occupied space and an infinity of vacant space surrounding a finite universe. Either idea is equally incomprehensible; but the former is merely *beyond*, the latter seems *contrary* to reason.'

"And now as to the 'configuration of the universe,' we must keep in mind the fact that if it has no boundary it can have no configuration. Yet this fact need not wholly arrest our inquiry; for, although it may be true of the material universe as a whole, it cannot be true of the universe by portions. To answer our question therefore it is only necessary that we confine ourselves to that portion of the universe with which we are connected as a system. In looking upon the heavens on a clear

night we see ourselves surrounded first with thousands of stars (suns they are no doubt) of greater or less degree of brilliancy, and beyond that is that broad belt known as the Milky Way, crowded with millions of stars (suns too, no doubt), forming around us a complete ring. This proves, as most suppose, that the Milky Way is an immense flat disk, and that our sun is one of the stars composing it; or it may be that the Milky Way is a great *ring*, like the annular nebulae just now spoken of, and that our sun occupies a place in the comparatively vacant middle of it. Something of this sort must be the configuration of our 'island universe,' that is, a ring or a disk, whose diameter is many times greater than its thickness. What that diameter is may

be conceived from the statement recently made by a French savant, who says that 'although light travels at the rate of one hundred and eighty-five thousand miles per second,' yet 'to traverse the sidereal world of which we form part (the Milky Way) light takes fifteen thousand years. * *

* * To reach certain of the nebulae it must travel for three hundred times that period, or 5,000,000 years. * *

Such are the dimensions actually measured in the general constitution of the universe. As yet we are only on the vestibule of the edifice, on the edge of the abyss of infinitude, and we shall never penetrate very far beyond."—*F. R. Goulding in Home and School.*

ORGANIZING A NEW SCHOOL.

On entering a new School a teacher is obliged, in the first place, to ascertain the present condition of his pupils, their advancement, the studies that they are to undertake, their capacity for learning, their dispositions, and some other matters pertaining to them. He is very likely to find his prospective charge a complete chaos, into which he must introduce order and system. Perhaps his predecessor has left with entire unconcern about the future of the school, considering it none of his business what is next to be done therein. Perhaps since the last term new pupils have come into the district, and some have removed. In graded schools similar changes result from promotions. A change of administration generally concerns nobody but the teachers, and the incoming one has the greater task to perform. To organize a school of fifty or more pupils, with whom the teacher has had no previous acquaintance, is a work that requires some tact. But by the exercise of a little ingenuity, it may soon be brought into working order.

In some instances the work of organizing is delayed, in the expectation of more pupils entering, so as to complete certain classes. This is unjust to those who enter at the commencement of the term. These should be immediately set to work, and

should see the advantage of their early entrance, and those who come afterwards should be shown the loss that they have incurred. A temporary arrangement may be made at the beginning, and the modifications and changes made afterwards, as circumstances require. Whether the number of pupils at the beginning be many or few, they should be forthwith set to work in some way.

On entering a new school a teacher does well to listen to hints from the school-board, parents, and pupils, about former plans and customs, and what is now deemed necessary, but his judgment must be brought into requisition, to determine how far he may be controlled by them. He may hear some things that will deserve nothing but a respectful hearing. If he fully understands his business, he will know how to go to work when he has ascertained the character of his charge.

After opening the new school, and pronouncing his preliminary address (if he deem this appropriate), he should give general explanation of his plans and methods of conducting exercises. He then should enrol the pupils, their ages, and the studies that they intend pursuing. For this purpose he should have papers ruled with columns for their names, ages, and branches

of study. From these papers the names can be copied into the register and class-book. He will by this means ascertain what classes he will have, and then know how to make a programme of daily exercises.

In ascertaining the studies that the pupils intend taking, and their present status, he may first take their word. Next he should assign a lesson in each branch which they desire to take. After hearing a lesson by each class, he will have some idea of the time that they will require; he will also know whether they are competent to proceed as they first report themselves as intending, or whether they must be set back. When these, and some other things, are known, he must assume the prerogative of arranging classes and directing studies.

On each succeeding day, as the teacher observes new pupils in attendance, he should greet them in a respectful manner, then proceed to enrol their names and studies, as he did with others on the first day. He should then assign them seats, and inform them when their times of recitation will be; thus he will set them to work at once, and he should make them feel at home. Neglecting to do this is a gross act of injustice to a new pupil, and it may much injure the character of the school, while a careful attention to it will be a great advantage.

A teacher who fully understands his work, knows what studies and exercises will be most profitable for each pupil. Some respect is due to the wishes of parents and the inclination of their children; but he must have authority to enforce such regulations as he knows will most benefit his school. He cannot be expected, however, to yield to all the whims of crotchety people. He should rather be able to show what is most needed.

The daily exercises of a school should be so regulated as to give each pupil, as nearly as possible, the same amount of time for study and recitation. Justice to all requires this. Teachers are often accused of partiality in giving more attention to some pupils than to others. This they must sedulously guard against, and they can easily do it. When a school is fully organized, and a routine of exercises established, it should be strictly followed till a necessity for change is apparent. The labor of each day will thus be much facilitated and rendered more efficient. There are many other things that will call for the teacher's ingenuity, and he must be prolific in expedients. What applies well in one place may not in another. But few rules can be made that will not require exceptions, and hence adaptation to present needs must be studied and practiced.—*G. D. Hunt in National Teacher.*

METHODS OF SECURING ATTENDANCE AND PUNCTUALITY.

One of the greatest evils which meets a teacher at his entrance upon school duties, is the irregular attendance of pupils.

The pupil who is frequently absent falls behind his class, becomes discouraged, and as a natural consequence loses all interest in study and school. So the pupil who is habitually tardy, is forming a habit which will cling to him through life, the tardy boy making the tardy man.

A more valuable habit than that of punctuality can not be engrafted upon the life of a child. Men who are punctual are, other things being equal, the most successful in life. This is a fact which can not be dis-

puted; it behooves us, then, as teachers to use all lawful means to secure good attendance and punctuality in our pupils. I used the following plans in the school I taught last year.

At the end of the first month, I called together those pupils from every grade who had been either absent or tardy. Their names were written in a book; the cause of each delinquency was carefully inquired for. If I deemed the excuse worthy, I marked the pupil excused; if not, I either wrote to the parents concerning the absence or went to see them. In this way the co-operation of the parents was secured, and the children were impressed with the im-

portance of attending school regularly. Of the thirty cases of tardiness in the building, (enrollment four hundred and twenty-five), I found that, with two or three exceptions, all were the result of carelessness, or indifference. I talked to them earnestly upon the subject and tried to awaken a school pride. I showed them the evils resulting from tardiness, and related anecdotes, illustrating the importance of punctuality. The result was, that the next month the same pupils were not tardy again; the same thing was true with respect to absence. Each succeeding month I pursued the same plan. If a pupil was tardy through carelessness, I required him to make up ten times the time lost. I had also a picture which went from room to room, remaining

for one week in the room which the previous week had the highest per cent. of attendance, and punctuality combined. I also gave to this room some interesting oral exercise, related a story or read something pleasing from a book. As a final incentive, I gave a half holiday to those pupils who had been neither absent nor tardy during the month.

The result was, that during the last month, with an enrollment of four hundred and thirty, in a manufacturing town, with children in every condition of life, there was but one case of tardiness, and ninety-seven per cent. of attendance. A child was accounted tardy unless he was within the room at the last tap of the bell.—*H. G. Snyder, in Western Journal of Education.*

EDUCATIONAL INTELLIGENCE.

—Charges of favouritism and irregularity having been preferred by one of the Ottawa Public School teachers against the City Inspector, the Commissioners appointed by the Ontario Government to investigate their truth have ascertained that the answers in arithmetic and natural philosophy were furnished to the candidates at the recent teachers' examination. Such a practice is most reprehensible, since every examiner, as well as every one who has ever passed an examination, knows that the possession of the answer constitutes a most important aid to the correct solution of a mathematical problem. In a neighboring county, at the same examination, one of the examiners is said to have furnished candidates with the question papers the evening before, a violation of both express and implied instructions which calls for instant dismissal of the offender, if the offence is capable of proof. It is to be hoped that an official inquiry into the truth of this report will also take place.

—A meeting of the Thames Teachers' Association was held in Ridgetown on Saturday, the 6th inst. The meeting commenced about half-past ten, the President, Mr. Bryden, in the chair. The secretary being absent, Mr. McDiarmid was appointed to act. After a few formal remarks from the President, J. A. Walker proceeded to open

the discussion on 'Reading.' He spoke of the importance of cultivating a clear and distinct articulation, and instanced several common faults into which the careless reader was very likely to fall. He thought it a grievous fault that learners should be required to read lessons which they could not clearly understand, and looked upon it as a very bad principle that teachers should hurry pupils from one book into another before they could read the first expressively and intelligently, thinking by this means to curry favor with the parents. He recommended that the lessons be read first for correct articulation and then for correct expression, and that the teacher should thoroughly explain all difficult passages. He looked upon the fifth book as altogether too difficult for the use of Public Schools, owing to the amount of historical and scientific matter which it contains, and thought some means ought to be devised by which we could obtain a better class of text-books. Mr. F. B. Harrison (Inspector), also spoke of the importance of pure articulation, and thought the pupils should be taught the sounds rather than the names of letters. He said that the meaning of every word should be explained to the class, and recommended synthetical analysis for larger pupils as useful in procuring correct punc-

tuation. He was followed by Messrs. Bryden and McDiarmid, who agreed with the previous speakers in their methods of teaching reading, and condemned the present text-books as inadequate for the use of Public Schools. The Secretary, Mr. Edwards, having arrived, the minutes of the previous meeting were read and approved, the financial statement submitted, and several persons were proposed as members, after which the meeting adjourned until 1.30 p.m. In the afternoon session a discussion took place as to the proper place for the permanent location of the Association, when a resolution was carried declaring this in future to be an Association for East Kent, and to hold its meetings quarterly at Ridgetown. Mr. Bryden introduced the subject, "English Composition." He spoke of the great benefits of this much neglected branch of education, and thought that one great reason for its being so much neglected in our public schools is that teachers themselves are very far behind what they should be in the art. He held that it might be taught pupils almost as soon as they entered school. For beginners some very simple themes might be given, and the teacher could draw out suggestions by asking questions which would lead the pupil to think. They might be asked to describe familiar scenes, relate stories, form sentences containing given words, &c. Care should be taken not to discourage the learners by any harsh criticism. Mr. Harrison thought composition should be taught very much like object lessons. Something might be presented and the pupil asked to

describe it. J. A. Walker said that children began to compose as soon as they began to talk. A good method for beginners was for the teacher to write some common subject on the blackboard and desire the class to say something concerning it, and take down every statement made. He held that quantity, not quality, should be first required. After the pupils advanced in knowledge they could then learn to connect their statements properly. Mr. McDiarmid agreed that composition should be on the same principle as object lessons. For more advanced classes regular themes might be given, and the pupils allowed to criticise one another's work. He found his pupils to take quite an interest in this study. Messrs. Foy and Edwards followed, after which a "Question drawer" was opened for the benefit of any desirous of asking questions upon the subject. A very exciting discussion took place upon the "Best method of apportioning the Government Grant," in which Messrs. Edwards, Harrison, McDiarmid, Bryden, Walker and Sinclair took part. A resolution was carried recommending the distribution of a portion of the Government Grant in Schools according to results. Mr. McDiarmid, was elected President in lieu of Mr. Bryden, who resigned, and Miss Bissel was elected 1st Vice. The subjects for discussion at next meeting are, the advisability of establishing Township Boards of Trustees, and the best method of teaching Arithmetic to small pupils. The meeting adjourned to meet again at Ridgetown on the last Saturday in February, 1876.

CHOICE MISCELLANY.

—In education, the method is everything.

—All is but lip wisdom that wants experience.—*Sidney*.

—He who can not learn from a child can never teach one.

—What is defeat? Nothing but education—nothing but the first step to something better.—*Wendell Philips*.

—Of ten infants destined for different vocations, I would prefer that the one who

is to study through life should be the least learned at the age of twelve.—*Tissoe*.

—The gathered stores of all our knowledge and wisdom are but a grain of sand in the desert, or a single star in the measureless heavens, compared with what waits for our search to find out.—*Duff Porter*.

—Talent for talent's sake is a bauble and a show. Talent working with joy in the cause of universal truth lifts the possessor to new power as a benefactor.—*Emerson*.

—“My son,” said a stern father to his seven year old, “I must discipline you. Your teacher says you are the worse boy in the school.” “Well, papa,” was the reply, “only yesterday she told me I was just like my father.”

—Much will be gained when education, and culture, and authorship shall dare to take this high stand that Milton took; shall dare to pass by beauty in the start, and aim at higher elements and severer qualities, in the train and as the ornament of which a real beauty and absolute grace shall follow of themselves.—*Dr. Shedd.*

—If you can not answer a question pointedly and clearly when asked, say so; think until you can; then, after the lesson is recited, give the information desired. Some teachers are afraid to say frankly that they do not know a thing, and pupils soon find out their weakness.

—The office of the teacher is not to reform, but to form. One former is worth a thousand reformers. A reformed man is never as good as one that was formed right at first. Give us an army of conscientious, trained teachers to mould the characters of the children of the present, and there will be little work for reformers among the men of the future.

—Never refer to natural and peculiar weaknesses of pupils in presence of the school. It can only excite contempt for the teacher who does it. If a pupil is frequently told that he does not know anything, he will either settle down to a belief in it, thinking it of no use to try to be anything but a dunce, or he will be excited to a degree of anger equally disastrous to mental or moral advancement.

—The surest way to secure order in school is to teach the children that they should abstain from whispering and making noise, passing notes, etc., not because these things are wrong in themselves always, but because they hinder the work of the school, attract attention, take up time, and prevent study—in other words, to teach the child to detect something in the act beyond the thing itself, to see its end.

—One teacher took her class in geography and began with the town in which the pupils lived, locating their houses and the principal public buildings. Then each pupil was as-

signed some special topic, upon which to obtain all possible information. One took the foundry, and learned the number of men employed there, the kind of iron manufactured, etc. Another took a particular kind of business, like banking, and so on. When the town had been thoroughly studied then the county was taken up, and finally the State. For information the pupils resorted to books and to conversation with their parents and friends. Teach your pupils to fight manfully in the warfare of good against evil, truth against error; and above all, let the eternal principles of right and wrong govern your life and form a part of your own character. If you do this, you will sow beside all waters, and eventually bring home your sheaves with rejoicing.—*Maine Journal of Education.*

THE WORK TO COME.—Is it not possible for the teacher to enjoy vacation months, to grow stronger by the days of continued rest, and all the while to be doing the numberless little things he will have no leisure for by and by? If ignorant of Zoology and Botany, let him begin the study by cultivating the acquaintance of plants and animals that are seen every day. Learn the history of our domestic fowls and beasts. Get the classification of our most common plants, and study their habits—what are a few of the plants included in the same class with the cabbage or potato, with wheat, beans, apples, strawberries, onions, dandelions? Talk up gardening with every farmer you meet, and learn all he can teach you. The nurseryman will give you a world of interesting facts concerning useful as well as ornamental trees. Have you enough knowledge of practical book-keeping to keep properly a cash account? All these will be interesting matters to teach your pupils next fall and winter, through object lessons or in aid of the text books.—*Ind. School Journal.*

THE TEACHER'S DUTY.—The teacher who takes an interest in her work, and is conscientious in its performance, feels that her duty cannot be compressed into six working hours per day. I say that no teacher who spends exactly the six hours (required by law) a day in the discharge of her duties, and no extra time, does her duty; because her whole time is spent in labor, and therefore there can be no system. System demands forethought and well-laid

plans. This thinking and planning must be done out of school hours. The morning is the best time for this, because then the brain is rested and clear, and prepared for work. At night the head is wearied and worried with the cares of the day, and not in a fit condition for mental labor. Therefore, teachers, *rise early*, and devote at least one hour each morning to your school. Think out your methods for the day, and study up something new to interest your pupils. If you do this your labor will become easier, your school pleasanter, your scholars more interested, and your work more satisfactory to yourself and to your patrons.

HINTS CONCERNING STUDY.—It is not proved either by school statistics or health statistics that there is too much study in the civilized nations; certainly the general intelligence of any people has not reached the point of redundancy in knowledge. The fault is more in methods and habits of study than in quantity. Ministers are sometimes called "hard students," and are pitied because they have to spend so much time over their sermons. But not one minister in ten who breaks down prematurely is disabled because he has done too much or worked too hard, but only because he has worked in the wrong way. The amount of study does not do the mischief—it wearies and kills only because it is badly adjusted. Some will study straight on for two, four, six or eight hours, with no relief, reading incessantly, writing incessantly, hardly stopping for food. Six or eight hours a day are not excessive in quantity, but six or eight consecutive hours are sure self-destruction. Few constitutions can stand the strain, even if all the rest of the waking hours be spent on the play-ground, and a solid bar of sleep be put between the days. —REV. C. H. BRIGHAM.

THE ABUSE OF BLACKBOARDS.—The more familiarity with chalk the better. Green is to be preferred to black for the schoolroom. There should be no seats for pupils under the boards, on account of the dust. The space assigned to each pupil on the board should be proportioned to his kind of work. Little girls behave better than boys at the board, especially in their ways of standing; so look to the latter when there. The pupil should stand generally at the right of the board. One

abuse is the amount of noise made in handling the chalk, which should be obviated at once. The work may be almost noiseless, especially with the better class of crayons. Regulate the strength to be put upon the chalk. Get uniformity of clear, bold figures of medium size, written with a steady and distinct impression. The method of erasure is another abuse. Sometimes only partial erasure is made, and often a great dust is made by violent and rapid rubbing. No dust flies when the rubber stops at the end of a single rub; but it falls quietly into the trough. Another abuse results from the carelessness of the pupil in beginning his work in the wrong place, at random upon the board. This should be carefully regulated. In general, he ought to begin at the left upper corner.

—1. If you would have no drones in your school, talk at each recitation to the dullest in your class, and use all your ingenuity in endeavoring to make him comprehend. The others, then, will be sure to understand.

2. Make each exercise as attractive as possible. Think out your methods beforehand, and illustrate freely.

3. Cultivate self-control. Never be led into confusion, and above all be in earnest.

4. Be cheerful and smile often. A teacher with a long face casts a gloom over everything, and eventually chills the young mind and closes the young heart.

5. Use simple language when you explain lessons. Long words are thrown away in the school-room.

6. Thoroughly teach each pupil on the lesson, and do not be afraid of repetition. Review every day, or much time will be lost.

7. Do not try to teach too much; better teach a little, and teach it well.

8. Endeavor to make your pupils understand the meaning of what they study. Probe the matter to the bottom, and get at the real knowledge of your scholars.

9. Cultivate the understanding, and do not appeal to the memory directly.

10. Lay the foundation of knowledge firmly and well.

11. Impart right principles, and lead your pupils to higher levels, to a nobler range of thought. Endeavor to accomplish all that skill, intelligence, and love can suggest.

A JAPANESE BATH.—In Japan, even in the lowest inns, the traveller's request for a

bath is never met with that stare of blank astonishment which often attends the demand in our own and every other European country. I know in Ireland I once asked for a bath, and they brought me a horse-bucket; and on another occasion, in France, I could get no nearer the article than a horse-trough; while in England and Germany the request has more than once led to a serious breach of the peace between myself and the landlord. In Japan, on the contrary, there would be much more surprise felt if the traveller did not ask for one. There were no preparations required, no rushing about of chambermaids, no turning on this and off that—everything was quite ready, and I was at once conducted to a huge wooden bath with a small earthen furnace let in at the foot, and a lid enclosing the whole of the top with the exception of a space just big enough for the head of the bather to emerge through. In one of these contrivances, with a small furnace burning gaily, a Japanese, after his day's work is over, will sit calmly boiling himself with the lid on, and the water bubbling about him at boiling heat. He seems, however, to like it uncommonly, to judge from the pleased expression on his face fast deepening under the process into beet-root like tints; and when he has at last had enough—about an hour of it—he takes off the lid and emerges as much like a boiled lobster as a human being can become. My bath was quite ready: the small furnace glowed with live pieces of charcoal; the water bubbled merrily, and my companion of the bath, taking off the lid, invited me to enter. Not being, however, either a Japanese, a blue lobster, or a potato, I did not see any particular object in being boiled, and so had the fuel raked out of the furnace and a few buckets of cold water added before I got in.—*Temple Bar.*

READING—One of the chief requisitions of good reading is that the reading be understood. Nearly every failure to secure this requisite may be referred to inarticulation or to improper inflection. To correct the first-named fault, the teacher should frequently require exaggeration of pronunciation. There is little danger that such exaggeration will be carried to excess—that is, that pupils will become by this means affectedly precise in pronunciation. The tendency is obviously in an opposite direc-

tion. The second fault mentioned, improper inflection, seems to some teachers an almost insurmountable barrier in the way of securing good reading. Many pupils who know how a piece ought to be read are unable to give the right inflection. How often does the teacher say, "Keep your voice up," or "Let your voice fall," and even give an appropriate example, with little or no avail? This difficulty, in most cases, may be easily overcome by the following method. The teacher, having taught his class what rising, falling, circumflex, and level inflections are, pronounces the vowels in their order, and requires his pupils to state what inflection is given to each; then the process is reversed, and the teacher calls upon the class to pronounce the vowels with the inflection which he names. The same letters are then written upon the blackboard, with marks of inflection over them, and the pupils are called upon to pronounce, giving each vowel the inflection indicated. Again, sentences are written upon the board with an appropriate mark of inflection over each word, and the pupils read separately or in concert. It is a good plan occasionally to have the words of an entire selection in the Reader marked with reference to inflection. The next step in teaching reading, if it has not already been taken, should be to teach the meaning of the selection; and no branch of study in our schools affords a better means of mental discipline than this, and when properly conducted, few exercises are more interesting:

TEACHING WHAT WE MAKE IT.

Teaching is pleasant, or teaching is irksome,

Just as we chance to take it;

Teaching is pleasing, or teaching is tiresome,

Just as we choose to make it;

And teachers who grumble, and teachers who scold

At pupils and their daily recital,
Would grumble and scold if the wisdom untold

Of a Solon was at their disposal.

It is all very well to have talent and lore,

But if these we have not we must bear it;

It is all very well to have muscle in store,

Though we find if we must, we can spare it;

But if cultured or not so, and teaching is
new,
We'er wise if we teach well what we do
know,
And earnestly follow this old maxim so
true
That, "Thoroughness with instruction
should go."

To encourage us on when we meet with re-
proof,
Cheering us onward when nigh to des-
pair,
Is the thought that we will, in all honor and
truth,
Be remembered by the youth in our care
And in city or country, wherever we are,

And no matter what be our position,
Be our hearts but in tune, and our ~~ways~~
above par,
Gladly received will be our instructions.

Not all can be noted, but all can be ~~noble~~
For our work's the same—the ~~noblest~~
the best,—

And if *truly* we teach the best we are ~~able~~
The effort put forth will surely be ~~blest~~
Yes, teaching is irksome, or teaching is
pleasant,

Just as we are happening to make it ;
But if we cheerfully teach, our hearts ~~to be~~
lent,

To our teaching a pleasure will charm ~~it~~

TEACHERS' DESK.

J. C. GLASHAN, ESQ., EDITOR.

Contributors to the 'Desk' will oblige by obser-
ving 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.
3. To write their names on every sheet.

ANSWERS TO CORRESPONDENTS.

ROBT. DRINNAN, Elmvale. Ere answering you we must first know the object you have in view in your studies. Shall write to you.

E. T. HEWSON, Garnet. You merely solved $x^2 = 207$ &c. The problem cannot be solved by common algebra.

ANSWERS TO PROBLEMS.

(105.) Two drains are dug under a Township By-Law. The first to cost \$1,300, whereof A is to contribute \$110, and the second to cost \$450, whereof B is to contribute \$86. The By-Law provides that one-fifth of the principal and the accrued interest on the unpaid part thereof, shall be levied every year to defray the cost. The Debentures are issued 21st May, payable 1st January at 3 per cent., and for four years the contributors pay according to the estimated cost, when it is discovered that the first drain cost \$1169.84 and the second \$486.14. What amount must be levied on A and B during the fifth year?

(Work only to the nearest cent.)

H. T. SCUDAMORE, Sutherland's Corners.

(106.) Two Lots are assessed to a Drain in the sums of \$76 and \$79. Principal to be paid in six equal Annual Instalments and Interest on unpaid Principal, yearly at 6 per cent. Debentures issued 1st June, payable 5th January. Three years since have been levied, when it is found that the Clerk has inadvertently charged the Lots at \$79 and \$86. What payments must each Lot make during the next two years, so that the mistake may be rectified?

[NOTE.—These are questions actually occurring to me as a Township Auditor.]

DITTO.

Let A be the estimated cost, a the actual cost. R the rate, of increase and debt through accruing of interest from date of issue of debentures to date of first payment, R' the annual rate of increase thereafter, n the original number of payments, m the number of payments still due at time of adjustment, there having therefore been $n - m$ payments made.

Hence at date of last made payment the amount yet due is by estimate $\frac{m}{n}A$, but up to date the accrued value of excess of estimate over actual cost is $(A - a)R' R^{n-m-1}$. Hence the amount actually due is

$$\frac{m}{n}A - (A - a)R'R^{n-m-1}$$

and the annual payment will be

$$\frac{A}{n} - \frac{A-a}{m} R' R^{n-m-1} + \text{accrued interest on}$$

the unpaid part of $\frac{mA}{n} - (A-a) R' R^{n-m-1}$

Suppose p the number of payments yet to make, p being not greater than m ; the first of these will be

$$\frac{A}{n} - \frac{A-a}{m} R' R^{n-m-1} \quad \left\{ \begin{array}{l} pR - (p-1) \end{array} \right\}$$

Since this is the first payment after $n-p$ have been made it may be called the $n-p+1$ payment.

Applying these formula to the above problems, we have

Prob. 105, case I.

$$A = \$1300, a = \$1169.84; R' = \frac{3}{8} \frac{8}{8}, R = 1.08, n = 5, m = p = 1;$$

hence the fifth or last payment should be

$$\$ \left\{ 260 - 130.16 \times \frac{3}{8} \frac{8}{8} \times 1.08^3 \right\} \times 1.08 = \$94.986$$

For \$110 out of the \$1300 the payment should be \$8.04.

Prob. 105, case II.,

$A = \$450$; $a = \$486.14$, the other quantities the same as in case I.; the last payment should be

$$\$ \left\{ 90 + 36.14 \times \frac{3}{8} \frac{8}{8} \times 1.08^2 \right\} \times 1.08 = \$148.79$$

and of this B should pay \$28.44.

Prob. 106, case I.,

$$A = \$79; a = \$76, R' = \frac{3}{8} \frac{8}{8}, R = 1.06, n = 5, m = 2, p = 2 \text{ and } 1,$$

hence the fourth and fifth payments should be respectively

$$\$ \left\{ 15.80 - 1.50 \times \frac{3}{8} \frac{8}{8} \times 1.06^2 \right\} \times 1.12 = \$15.74$$

$$\text{and } \$ \left\{ 15.80 - 1.50 \times \frac{3}{8} \frac{8}{8} \times 1.06 \right\} \times 1.06 = \$14.90.$$

Prob. 106, case II.; the fourth and fifth payments may similarly be found to be \$18.98 and \$17.96 respectively.

(The above are two of the best problems in interest we have for a long time seen, they are out of the common groove, yet as the proposer states, they occurred in actual business transactions).

(107). Three masses of gold, silver, and a com-

pound of gold and silver, weigh respectively, P , Q , and R ounces in air, and p , q and r ounces in water. Shew what is the order of magnitude of the quantities

$$p : P, q : Q, r : R.$$

GEO. SHARMAN, Forest.

The specific gravities of the gold, the compound, and the silver are respectively

$$P : P-p; R : R-r; Q : Q-q$$

these are therefore arranged in decreasing order of magnitude.

Hence $1 : 1 - \frac{p}{P}$; $1 : 1 - \frac{r}{R}$; $1 : 1 - \frac{q}{Q}$; are in decreasing order of magnitude. But the antecedents are the same, hence the consequents are in increasing order of magnitude. But the minuends of these are the same, hence their subtrahends, $p : P, r : R, q : Q$ are in decreasing order of magnitude.

(108.) The tube of a Mercurial Barometer is vertical, and of uniform base. On a syringeful of air being introduced into the upper part of the tube the mercury falls 1 inch; and it falls eight-tenths of an inch more when another syringeful is introduced. The mercury in the cistern being kept at the same level throughout, find the length of that portion of the tube which was originally a vacuum.

DITTO.

Let h equal the length sought. The first syringeful occupies $h+1$ inches of the tube at a pressure of one inch of mercury. When the second syringeful is added the two occupy $h+1.8$ inches of the tube at a pressure of 1.8 inches of mercury, hence one syringeful at that pressure would occupy $\frac{1}{2}(h+1.8)$ inches of the tube. Therefore by Boyle's Law

$$h+1 = .9(h+1.8)$$

$$\therefore h = 6.2.$$

(109.) Find the pressure against the valve, which opens into the receiver of a condenser, after fifteen strokes of the piston, when A equals content of the receiver, B equals content of the barrel, and P equals the atmospheric pressure.

DITTO.

After fifteen strokes the receiver contains in volume A , air which at pressure P filled volume $A+15B$, hence by Boyle's Law the pressure on the valve will be

$$P(A+15B) \div A$$

EDITOR'S DRAWER.

—We purpose publishing Mr. Godfrey's valuable paper on Phonetic Orthography in the January No. of the TEACHER.

—We would direct attention to the advertisement of Littell's *Living Age*, on cover. It contains the

cream of current literature, and is one of the very best magazines published anywhere.

THE EDUCATIONAL VOICE.—This is the name of a new monthly, published at Pittsburg, Pa., U. S., the first No. of which has reached us. Its type

graphical appearance is very creditable, and its selections and original matter are of a very interesting character.

—A correspondent asks for information in regard to the number of marks required to obtain a First Class Provincial Certificate. We are not now in a position to give an answer, but we believe he can get the information he wants by writing to the Educational Department.

—We send out with this issue of the TEACHER a number of accounts to parties in arrears, which are in all cases brought down to the present No., 36. We trust there will be a general response, and that all arrears will be remitted promptly, together with the subscription for 1876. This is the more necessary, as we are now adopting the system of PAYMENT IN ADVANCE.

POSTAL GUIDE.—We have received from Hunter, Rose & Co., a copy of the Postal Guide for the Dominion of Canada. This is a new venture of this enterprising firm, and is intended to be issued quarterly. It contains a complete list of all the Post Offices in the Dominion, together with tables of distances, and is of such value that no business man can very well dispense with it. It is rendered particularly valuable from the fact that it is corrected quarterly from official sources.

CLOSE OF THE VOLUME.

With this No, we close our THIRD YEAR of publication. The success which has attended our enterprise has far exceeded our anticipations, and the ONTARIO TEACHER may now be fairly considered as thoroughly and successfully established in public favor. Although we are ourselves conscious of many shortcomings, and doubtless our readers fully share in this feeling, yet such has been the general appreciation of our labors, and such the kindly words of encouragement received from all quarters, that we flatter ourselves with the idea that on the whole our efforts have been a success, and that to suspend publication would be a source of general disappointment to the profession.

It is our intention during the coming year to put forth greater efforts than ever, to merit the esteem of those more immediately connected with our educational institutions. We will still continue editorially to give our views on all questions affecting the profession, with freedom, irrespective of any political or sectional bias whatever. The interests of education and the standing of the profession, will be the only consideration which will guide our decisions, or govern our advocacy of any particular policy in educational matters.

In regard to the original contributions which may appear from time to time in our columns, we cannot

promise much. We regret that many of our best teachers do not avail themselves of the opportunity we offer them for giving publicity to their views both on the Theory and Practice of teaching. While thankful for the many excellent articles received from several contributors—articles which have done credit to their literary culture and judgment, we repeat our regret that so few devote their leisure time to the great work of exciting their fellow teachers, by an example of literary industry. We trust, however, during the incoming year, that some who have not hitherto used our columns to give their opinions to the public, will do so, and that our old contributors will continue their 'labor of love.'

The solutions furnished by Mr. J. C. Glashan, Inspector for Division No. 1, Middlesex, have, we are satisfied, been very valuable to the profession. We are happy to be able to inform our readers that this department of our Journal will not lose any of its interest in future, as Mr. Glashan consents to continue in charge for another year.

Owing to the frequent change in the location of many of our subscribers, we meet with considerable loss on our annual subscriptions. In order to guard against this in the future, we purpose adopting the system of PAYMENT IN ADVANCE.

We further purpose that as soon as any subscription expires, to WITH-HOLD THE TEACHER, unless subscription is RENEWED. Our subscribers will not, we trust, take offence, should they find their names struck off the list. The label on each number of the TEACHER shows the date to which subscriptions are paid, and so there need be no difficulty in ascertaining the proper time for renewal. We trust that this business like way of conducting our Journal will be found satisfactory. The margin on the publication is so small, that we can ill afford the many losses that occur at present under the credit system. With this No. will be found an envelope duly addressed, in which subscriptions can be forwarded, which, when paid and registered, will be at our risk.

In appealing to the profession for a continuance of that confidence and patronage, so kindly accorded us in the past, we indulge the hope that we will be able to add to the influence of the profession, promote the interests of education, and materially enhance the practical value of the instruction imparted in our schools. We trust no further intimation will be required to secure a large and generous support from those who are engaged in the profession, and an increase of our subscription list far beyond its present limits.

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