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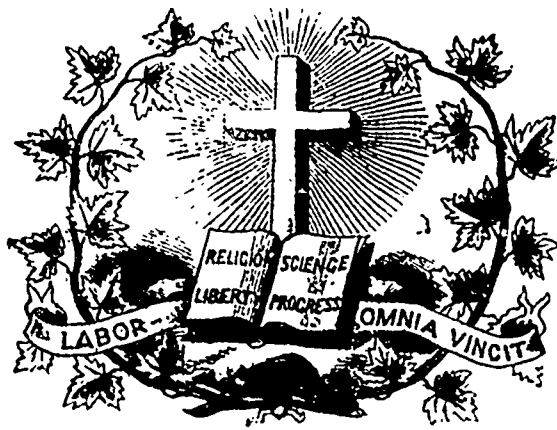
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On Educational Training.

AN ESSAY, BY NEIL ARNOTT, M. D., F. R. S., F. G. S., ETC.

PART I.

1. In comparing man with the inferior races of animals it is seen that his great superiority to all is due not to his bodily strength or the acuteness of particular senses, for in these respects he is surpassed by many, but to his mind, with its great power of gradually acquiring knowledge of the universe around him, and of contriving arts to subject events to his will. His knowledge becomes power, and a man of cultivated understanding is as far superior to an uncultivated man as the latter is to a brute.

2. A most striking point of difference is that man can form and use language, whilst brutes cannot. A brute can know only what its individual experience may teach it concerning the one spot of earth on which it resides, and the one small portion of time during which it lives; but any man, through language, may learn what other men have known or done. And after the inventions of writing and printing, which made language visible and permanent, a numerous society, or indeed the whole human race, may be regarded as

forming only one vast rational being, with millions of eyes and hands, and separate yet connected minds, all laboring for the common good, and with memory which never forgets what has once been known. This great compound being has evidently yet the characteristics of youth, and is manifesting rapidly increasing vigor.

3. A savage man cannot contend in strength with the elephant or lion, nor run with the deer, nor see in the night like the owl, nor smell like the setter dog, etc., but the son of civilization constructs and controls, as if it were part of himself, the noble steam-engine, with force of a hundred elephants, if he wills it, to do any work; against the assailing lion or tiger he can point his fire-arms with instant effect; the deer or grey-hound is a sluggard to him as he glides along on his railway; the owl's sight is blindness compared to his when aided by his telescope; and with his microscope he discovers worlds of life and activity, where the sharp eye of the wren can see nothing. Then he goes on steadily making additions to his powers.

4. Such facts exhibit man as a progressive being, in strong contrast with the other races of animals, which have changed as little since the beginning of human records as the trees and herbs of the thickets which gave them shelter. Men, from a primitive state of naked, houseless strangers in a land offering them only raw vegetables for sustenance, have gradually by the use of their reason attained their present high eminence. The inferior animals were formed by their Creator, such that within one life or generation, they should attain all the advancement of which their nature was susceptible. Some wants were at once supplied, as instanced in the clothing of feathers to birds, and of furs to quadrupeds; others were provided for by remarkable aptitude, conferred on the young to learn quickly the use of their limbs or organs, as in running, flying, swimming, etc.; and where more considerable mechanical skill seem to be required, as by the bee in making its honey cells, or by the bird in constructing its beautiful nest, there a peculiar instinct was bestowed. Thus a crocodile which issues from an egg hatched in the warm sand, and never sees its parent, become as perfect and knowing as any crocodile which

has lived before, or which will appear after it. How different is the story of man; he is born into the world the most helpless of living beings, and changes so slowly that, if deserted early by his parents, he surely dies; if, even after two or three years of care, he be abandoned entirely to himself, as to a few individuals has happened who yet had survived for a time in woods, he grows up in some respects inferior to the nobler brutes. Then history recounts of remote times, that over large portions of the earth men lived in condition little superior to that of brutes, as they may still be seen in Australia and elsewhere. Their condition is described as that of houseless savages, ill able to defend themselves against the wild beasts which shared the woods with them, and the inclemency of the weather, and the consequences of want and fatigue, and as being to one another often more dangerous than any wild beasts, unceasingly at war among themselves, and destroying one another with every species of even cannibal cruelty; and many countries formerly in such miserable state, have gradually become, through increase of human knowledge, fertile regions, with their noble cities, inhabited by myriads of civilized men.

5. Schools, colleges, universities and books are among the means which, in the progress of human improvement, have been contrived for thus cultivating the minds of individuals and of nations; and in regard to all of these there have been a progress of improvement as marked as in other things which have proceeded from the working of man's intellect. The decision, however, as to the subjects chosen, the order of study, and other particulars, had to be based on a due consideration of the whole field of human knowledge with its natural divisions, and the bearings of these on human welfare; and the views taken, until lately, were far from being complete. A simple arrangement, addressed to common apprehension, is here sketched

THE ORIGIN, PROGRESS, AND SCIENTIFIC ARRANGEMENT OF HUMAN KNOWLEDGE.

6. The human race is permanent; but the individuals composing it are in a course of constant change and renewal, at the rate of about a thirtieth part annually. The children, however, in receiving the bodily constitution of their parents, do not receive therewith the smallest portion of the knowledge which the parents possessed, but have to gather for themselves after birth through the five organs of the senses, which have been called, therefore, "the five gates of knowledge" and internal consciousness, the whole material of their own future store. Thus, when a child gets an orange for the first time, he receives impressions—first through the skin of the touching hand, of its size, form, weight, etc.; through the eye, of its color; through the palate, of its taste; through the nostrils, of its smell; and through the ear he may hear the sound or name which men have connected with it. The impression being retained in the memory as a group, constitute his knowledge of the orange. In the same manner the knowledge of other objects is obtained.

7. If, as a burning lamp is constantly supplied with oil to keep it alight, human beings, after birth, be duly supplied with the four prime essentials to life, they may live healthily for about seventy years, passing through the stages of youth, maturity and decay to death. These essentials are pure air, warmth, aliment, and rest, after work. If deprived of the first, the individual dies in a few minutes, as by drowning or other suffocation; if the second, he dies in a few hours, as when over-

whelmed in a snow storm; if of the third, he dies in a few days, or weeks, or months, according to the circumstances. The first indication of the child having animal sensibility is its struggle and crying when it wants a necessary, as food or warmth. It has then the feeling which it afterwards learns to call *pain*; when the want is supplied it becomes tranquil, and it has the feeling which it learns to call *pleasure*. In after-life, to obtain pleasure and to avoid pain, near or remote, become the great motive to voluntary activity. Among the objects around the child, it soon begins to distinguish those which most nearly concern it, by causing pleasure or pain; and thus the mother or nurse, the fire, the candle, become early acquaintances.

8. As the growing individual afterwards has the attention directed to the apparent infinity of objects in the universe around, the mind soon makes the grand discovery that there are resemblances among them—in other words, that the apparent infinity is only a repetition of a certain number of kinds. There are soon distinguished, for instance, what in the English language are called dog, horse, sheep, etc., among the things living and moving, called *animals*; the rose, myrtle, oak, etc., among things growing from the earth, called *vegetables*; and such as lime, flint, gold, etc., among things taken out of the earth, called *minerals*; and the mind, becoming aware that by studying a specimen or exemplar of each kind, its limited power of memory may acquire a tolerably correct knowledge of the whole enabling persons to obtain more easily what is useful to them, and to avoid what is hurtful; the desire for that knowledge, called *curiosity*, would arise with the first exercise of reason. Accordingly the pursuit of it has been unremitting, and the labor of ages has at least nearly completed an arrangement of the constituent materials of the universe under the three great classes of

Animals,
Vegetables,
Minerals (including all other things not having life).

commonly called the three kingdoms of nature, and of which the minute description has been called *Natural History*. And museums of Natural History have been formed which contain a specimen of almost every object belonging to the classes; so that now, a student, within the limits of a moderate space or garden, may be said to be able to have under view the whole of the material universe.

9. It might be thought that if a man knew all the *things* or existences in the world he had nothing more to learn. But it is not so, for the things of today do not remain the same for tomorrow. A seed is growing to be a plant, a boy to be a man, mountains are being wasted by the action of the weather, lakes are being filled up by the solids which the feeding streams carry into them, the tides and rivers and clouds are always moving. The universe, therefore, is a scene of constant motion or change. With respect to the *changes*, however, as with respect to the *things* themselves, the second grand discovery would soon be made, that there were resemblances in the multitude; and self-interest operating in the second case as in the first, having prompted to careful classification, we are enabled in the present day, as the result of countless observations and experiments made through a series of ages, to say that all the motions or changes, or phenomena (word synonymous here) of the universe, are merely repetitions of mixture of a few simple manners or kinds of motion or change, which are as constant and regular in every case as when bringing the return of day and night and of the

seasons. All these phenomena are found to be of four very distinguishable kinds or classes which have been called

Physical or Mechanical,
Chemical,
Vital or Biological, and
Mental or Psychological.

The simple phrases which describe the resemblances among them are called *General Truths, or Laws of Nature*. and as a body of knowledge, they constitute what is called *Science or Philosophy* in contradistinction to *Natural History*, already described. Now, as man cannot, independently of a supernatural revelation, learn anything but what respects either the momentary states, past or present, of himself and the objects around him, or the manner in which the states have changed. *Natural History and Science*, in the senses now explained, make up the sum of his knowledge of nature.

10. As an example of a general truth, or law of nature, we may take the physical law of *gravitation or attraction*, which declares that every particle of matter in the universe attracts and is attracted by every particle with a certain force varying in a certain manner with the distance.

1st. It may be observed that bodies in general, if raised from the earth and left unsupported, fall towards it with force called their weight. It has long been thought that flame, smoke, and certain vapors which, when free, ascend in the air, had positive *levity* as a property, the contrary of weight; but, after a time, it was discovered that these things were also substances having weight, but were immersed in an unseen atmospheric air which was *heavier* than they, and which, therefore, lifted them up as water lifts cork or oil. Thus a *resemblance* was detected where a *difference* had long been believed to exist. 2d. It is found that any contiguous, hanging bodies are drawn towards each other so as not to hang quite perpendicular, and that a plummet suspended near a hill is drawn towards the hill with force less than that with which it is drawn towards the earth, but in exact accordance with what should follow from the different sizes of the hill and earth, and the difference of distance of the plummet from the respective centres of the two. It is thus proved that weight itself is only an instance of a mutual attraction operating among all the constituent elements of the globe, and which explains, moreover, the fact of the rotundity of the globe, all the parts being drawn to a common centre, as also the form of dew-drops, rain-drops, globules of mercury and of many other such things. 3d. It is observed that all the heavenly bodies are round, as if formed of material obeying the same law. And, lastly, that these bodies, however distant, attract each other, for the tides of our ocean rise in obedience to the attraction of the moon, and become *high or spring-tides* when the moon and sun operate in the same direction. Thus the sublime truth has become evident, of which the sufficient proofs were first detected and arranged by the genius of the immortal Newton, that there is a power of attraction, called weight while acting on earth, and there maintaining a stable order among things generally, but which connects together also the distant bodies of this solar system, and probably as limited only by the bounds of the universe.

11. The process of comparing the facts or phenomena learned by observation and experiment, so as to extract from them the general circumstances in which they resemble, is called the method of reasoning by *induction*, because numerous single facts are brought together for examination and comparison; and the expression for such circumstances discovered with respect to them all,

is termed the truth, or scientific principle under which they are to be classed. Lord Bacon very clearly described the process. Progress in this kind of knowledge has been slow, owing to the great complexity of many ordinary phenomena, arising from several laws acting together and with great variety of combination. All the reasonings proceed on the assumption, early suggested, and afterwards confirmed by universal experience, that the *course of nature* remains uniform, and that what has happened once under given circumstances. The knowledge of these so-called laws enables an instructed man, when he witnesses some facts forming part of a known series, to announce what the state of things will be at any future time, and what it must have been in times past. Thus, by understanding the movements of the heavenly bodies, he foretells their positions at any future time so accurately that he publishes in the almanacs, without fear of errors, his prediction of the very moment of any coming eclipse. Even the wind and the rain, which in common speech are referred to as types of uncertainty and change, obey laws as fixed as those of the sun and moon; and already as regards many parts of the earth, man can foretell them with certainty; he plans his voyages to suit the coming monsoons, and he prepares against the floods of the rainy seasons. He can similarly judge of other future events belonging to the other departments of nature.

12. The *phenomena or changes* of nature when thus reviewed by the human mind, according to their resemblances, fall as naturally into the four scientific classes named above as the *things* of nature fall into the classes of natural history; and it will not further appear that the mind, to acquire complete acquaintance with phenomena, must study the classes in a certain order, which is that both of their mutual dependence and of their simplicity in relation to man's power of apprehension.

13. (2.) *Physics* (called also *Natural or Mechanical Philosophy*). The numerous changes among things which would first attract common notice and become objects of study, are those in which motions very evident to the senses occur. Such are the motions of all bodies falling directly or rolling down slopes; of currents of water and air, and of bodies carried by such currents; of bodies thrown or projected by any force; of machines, as water-mills, wind-mills; of carriages on railways; of the heavenly bodies, and so forth. All these are called *physical or mechanical motions*. Now, all these are explained by a very few general expressions or laws called since Newton's time, the laws of motion, and which are fully elucidated under the four words, *atom or material, particle, attraction, repulsion, and inertia*. It gives a striking idea of the nature and value of methodical science, to be told that a person who understands aright these words—viz: how the imperishable particles of matter, by mutual *attraction*, approach and cling together to form masses which are solid, liquid, or æreiform, according to the quantity or strength of the *repulsion*, of heat remaining among them, owing to their *vis inertie* acquire and lose motion in exact proportion to the force of attraction or repulsion acting on them—understands a great proportion of the phenomena of nature; but such is the fact. *Solid* bodies, existing in conformity with these truths exhibit all the phenomena of *mechanics*; liquids exhibit those of *hydrostatics* and *hydraulics*; airs, those of *pneumatics*, and so forth.

14. (2.) *Chemistry*—Another set of changes or phenomena, more tranquil in their nature, soon attract attention, such as the rusting of iron exposed to the weather,

the vanishing of charcoal placed in a fire-grate and heated to redness, the change of grape-juice into wine, and of wine into vinegar, etc.; and although in all of these there is a motion of ultimate particles assuming new arrangements, the human eye, not being able to see the particles, does not detect the motion, but in the results. Had there been only one kind of substance or matter in the universe, the laws of physics would have explained all the phenomena; but there are iron, sulphur, charcoal, and about fifty others, which, when taken singly, obey the laws of physics; but when brought together under certain circumstances, enter into combinations according to peculiar affinities. The innumerable phenomena of this class are now arranged under a small number of general laws of affinity, and the study has become proportionately simple. It is to be remarked, however, that during the changes the substances are not withdrawn from the influence of the physical laws, for no substance ever loses its weight or inertia. What are called chemical states and motions are therefore only modifications of physical states and motions, and many chemical changes are merely beginnings of physical change, as when the altered chemical arrangement of particles in ignited gunpowder produces the physical explosion. And nearly all the manipulations of chemistry, as weighing, measuring, transferring gases from vessel to vessel are directed by physics alone. Chemistry, then, cannot be to any considerable extent understood or practiced by a person who is ignorant of physics.

15. (3.) *Life, or Biology or Physiology.* The only changes or phenomena not comprised in the two classes of physics and chemistry, are some of those occurring in living bodies, and which, being the most complicated of all, have been the last to be studied and methodized; and much has yet to be learned respecting them. Such phenomena are growth, nutrition, decay, death, nervous action, etc. These occur in the midst of structures subsisting and acting in accordance with the laws of physics and chemistry, and laws of life, therefore, appear influencing the other two sets, and cannot be studied independently of them. The science of life, or physiology, has the two divisions of *animal and vegetable physiology*.

16. (4.) *Mind.* There remains still to be considered one class of phenomena or changes in nature which are cognizable to man, not by his actual organs of sense, but by his own consciousness or internal perception, and by his observation of the actions of other persons in different mental states—namely, the changing states of human mind. These, also, are found to proceed in accordance with laws. But it is to be remarked that the laws of mind, which man can discover, are laws connected with body, too, and influenced by bodily conditions, for how differently is the same mind manifested in youth and age, in health and disease! Mental science is by far the most important department of science, and it stands eminently distinct from all the others on several accounts. Unlike that of *organic or bodily* life, which could not be fundamentally understood until physics and chemistry had been previously investigated, this made extraordinary advances in some departments at a very early age, when the others, as methodized sciences had scarcely begun to exist. In proof, we may refer to the admirable writings of the Greek philosophers on logic, morals, government, etc.

17. The established order or laws of change in regard to sequences of mental states are well exemplified in the processes of *giving names* to objects, and of counting and measuring them. A single object, an orange for instance (as already described at Article 7), if placed

near a person, by acting on the different organs of sense and through the connecting nerves on the brain, causes in the mind a different sensation for each sense. The touch of the land gives the impression of size and shape, the sight gives that of color, the nose of fragrance, the palate of taste. These different impressions, called simple ideas, being made nearly at the same time, become associated or grouped together, and form the complex idea of the fruit, which remains afterwards permanently in the memory, and is reproducible at any future time by any other idea which has accidentally or purposely been associated with it, as of the person who brought it, or of the sound or word *orange name*. Any variety of simple ideas or of complex objects or motions producing complex ideas may be so observed, classed, and named. Then, further, it is found, that when any new object is met with resembling one already known, it suggests or recalls to the person that known one; and the idea ranging itself with others similar, previously known, joins a class formed in the mind, which class also may get a name. And thus language grows.—*N. Y. Journal of Education.*

To be continued.

How to teach Children.

BY A. BERGMANN.

The teaching of the first grade has been for some time the object of my study, because I look upon it as the foundation of all our work.

In every-day life we meet with comparatively few people who can not read, and, if reading were the sole criterion of intelligence, we might unhesitatingly call this decade a very intelligent one; yet, if we examine critically the language many use to express their thoughts, or consider how they understand the ideas of others, presented to them orally or in print, in a word, how they speak and reason, we shall find ourselves under the necessity of confessing that our generation is rather behind in that beautiful and pointed laconic mode of expression, in which the Spartans of three thousand years ago excelled.

The art of reading is certainly a key by means of which we may unlock, if so inclined, the great vaults, in which ages have deposited the result of their learning and wisdom, and without any assistance but a thirst for knowledge we may attain to the position of a luminary in the galaxy of the learned.

But does the art of reading also instill unconditionally a thirst for knowledge? If so, why do the majority of our school children, who are taught it, from the very first day of their school life, entertain rather a dislike than a love for their books? And this is a fact which every teacher experiences, if she lets her pupils decide for themselves whether they will rather read a beautiful story or have the teacher relate it to them. In nine cases out of ten they will unanimously decide for the latter.

If this be admitted to be true, the very important question presents itself: Can the school be expected to conquer such dislike, and how may it be done?

I am free to answer the first part of the question in the affirmative and shall also endeavor to show how it may be done; but first let me call your attention to the phenomenon which has doubtless come under the observation of most of us.

Let us take a boy of eight coming to school for the first time, perfectly illiterate, but possessed of common

sense, who is put into your lowest class, i. e. among children of six. Do you not always find that such a child will learn to read remarkably fast and not only be, in a very short time, equal to the best of his class, but even catch up with children of his age, who have spent two years at school, when our boy enters it? and in most cases this boy will be found superior in observation and understanding and in expressing his own thoughts.

Very few teachers, if any, will deny the above illustration to be one of every day occurrence.

The cause of this cannot well be looked for in the advanced age of the boy, nor in his bodily development, for the very reason that school children of six grow older and develop also; it cannot be said that the boy has intelligent parents, relations, etc., for such is the case with six-year-old school children too, and besides the intelligence of the teacher is often superior to that of many parents. It is then the child's absence from school which has worked so much in his favor? Not necessarily so. But it is certainly the development of thought and speech, which the boy has experienced during the two years which others have spent at school spelling and reading.

The little six-year-old has no correct idea of the subject of which his lesson in the primer treats, while the boy of eight, just entering school, knows at once that the sentence, "It is an ox," refers to a little picture opposite, representing an ox: He knows probably something about it, and a whole chain of ideas starts in his mind, while reading this and similar sentences; he is eager to know more about it, and learns fast to read and to spell.

Our boy was taught by nobody, he did not know a single letter, but he had used his senses, he had observed, reflected on objects, which interested him, and had spoken whenever there was something to communicate. Should our schools, perfect in many respects as they are, not be able to do more and better work than mere chance? Most assuredly so. We can do it, if we condescend to copy after nature.

And now I shall return to the question, "How may the dislike toward books be conquered in schools?"

Children upon entering school encounter a book with black characters, all arranged in straight lines, and now and then a black picture—it is the primer. In it they read continually the ideas of others and spell the words—for little children certainly a dreary work and it cannot be wondered at that they are glad when the recitation is over—they will naturally look upon books as their privileged tormentors.

Take away these tormentors from the first grade entirely. Make the children speak. Show them objects or pictures and lead them to produce oral compositions; tell them stories about the pictures, and make them relate them to you in return; and verily you will see bright eyes, smiling faces, and hear intelligent words and phrases enough in your room.

Do not fear that the pet child of our schools—discipline—will suffer by this, for a soft word from a teacher, who is a source of so much joy to the little ones, works wonders in an animated class.

Change the subject frequently; take objects from nature, especially animals and living plants; explain their mode of existence, etc.; and thus the first grade might well be excused from a lesson in "natural science" lasting an hour.

This mode of teaching the first grade will stock the minds of the little children with a vast amount of knowledge, received directly through the senses; it will lead them to form combinations, draw compari-

sons, and will under the guidance of a careful and intelligent teacher train them to express their thoughts in concise and correct language.

Combine with this, singing, arithmetic, drawing, writing and reading script, and you will have children whose mental faculties are amply prepared for the introduction of books and who will think the valuable gifts which will gratify their aroused appetites for knowledge, commanding, as they do, a goodly portion of it already.

At this stage the art of reading will not only be very readily acquired, but it will also prove to them a highly appreciated means of gaining more knowledge, and books will become and remain, what they ought to be, their friends for life. To teach the first grade in this manner is, by no means, easy work, and will require the most careful preparation on the part of the teachers. Some even might not be able at all to do it, but valuable help could be rendered to them by meetings like this one, where lectures on the subject might be given.

If the experiment should be made, and in European countries it is no more an experiment, the teachers in the upper grades would soon find a set of scholars with whom to work would be a pleasure, and those very pupils would enter life well prepared.

If my views upon the subject before us should happen to differ materially from others I beg you to regard all I have said as an opinion gleaned from careful observation and I hope it may give rise to more sound and earnest reflections, and indirectly help to benefit our common schools.—*American Journal of Education.*

Hints to Young Teachers.

In the most educational publications, as well as in teachers' conventions, associations, etc., it has seemed to me that too much was taken for granted, and consequently that the advice and instruction given frequently went over the heads of those who needed it most. There is a tendency to speak in a sneering, and contemptuous way of those raw beginners, green hands, etc., and of cheap schools, and country districts, and ignoring any claims they might be supposed to have; to give exclusive attention to the improvement of those who have already numberless advantages. It would be a great advance, indeed, if our country schools could have such buildings, apparatus, and experienced teachers, as most of our city schools possess; but we must take things as they are, and not as we would have them.

It is an undeniable fact, that in our land, there are thousands of schools, which either from the smallness of the numbers, or the poverty of the inhabitants, cannot afford to pay high wages, and consequently are obliged to employ inexperienced teachers; and these young teachers, with none of the helps so easily found in the city, with no opportunity to mingle with other and more experienced teachers, are expected to instruct scholars; of every degree of advancement from *a, b, c,* to algebra; and at the same time keep perfect order. If they succeed they gain no glory, and if they fail it is, "Just what you might expect, if people will employ cheap teachers.

I have felt a great deal of sympathy, for those placed in such uncomfortable, as well as unfavorable positions, and have hope that to such a few words of advice on the practical working and duties of school, might be beneficial. To those who have had experience, I have nothing to say, for if they have not learned from that, advice is useless.

Now, my friend, I shall suppose that you are somewhere from sixteen to twenty years old, and that you have never taught school. Your school-house is not particularly attractive; you have but a small supply of blackboards, no globes, no outline maps, none of the thousand and one things, which are like tools in a teacher's hands; but you are expected, as a discouraged pedagogue said to me one day, "to evolve everything out of your inner consciousness." You have, perhaps, a school of about twenty in prospect, of all ages, from little toddling things, sent to be out of the way, all the way up, to big burly boys a head taller than yourself, and giggling girls, who expect to study the big boys as much as anything. Your heart sinks every time that you think of next Monday, and you wonder if you can make them behave, and if you will succeed in teaching, and in doing it well.

You want the pay—I don't think anyone teaches from pure philanthropy—but you mean to earn it. You feel a sincere interest in the children, and you wish to benefit them mentally and morally, but you scarcely know how to do it, or what you should do first. Of course you must always depend upon your own common-sense, to apply and vary general directions to suit your peculiar circumstances.—*New England Journal of Education.*

The Pleasure of Study.

BY JOSEPH HALL.

I can wonder at nothing more than how a man can be idle, but of all others, a scholar; in so many improvements of reason, in such sweetness of knowledge, in such variety of studies, in such importunity of thoughts. Other artisans do but practice, we still learn others run still in the same gyre to weariness, to satiety; our choice is infinite; other labors require recreation: our very labor recreates our sports; we can never want either somewhat to do somewhat that we would do. How numberless are the volumes which men have written of arts, of tongues; How endless is that volume which God hath written of the world! wherein every creature is a letter, every day a page. Who can be weary of these? To find wit in poetry; in philosophy, profoundness; in mathematics, acuteness; in history, wonder of events; in oratory, sweet eloquence; in divinity, supernatural light and holy devotion; as so many rich metals in their proper mines; whom would it not ravish with delight?

After all these, let us but open our eyes, we cannot look beside a lesson, in this universal book of our Maker, worth our study, worth taking out. What creature hath not his miracle? what event doth not challenge his observation? How many busy tongues chase away good hours in pleasant chat, and complain of the haste of night! What ingenious mind can be soon weary of talking with learned authors, the most harmless and sweetest companions? Let the world condemn us; while we have these delights we cannot envy them; we cannot wish ourselves other than we are. Besides, the way to all other contentments is troublesome; the only recompense is in the end. But the very search of knowledge is delightful. Study itself is our life; from which we would not be barred for a world. How much sweeter then is the fruit of study, the consciousness of knowledge? In comparison whereof the soul that hath once tasted it easily contemns all human comforts.

Of Arithmetic.

BY MARY P. COLBLIN.

What a long word 'Arithmetic' is for such wee ones as we are dealing with! Their little tongues can hardly roll around its crooked edges, and yet its principles can be developed long before they are able to speak intelligibly. Once in a while there is presented before the teacher one of "Nature's noblemen" in embryo, who has no more idea of figures and their meaning, than he has of the moon, and whose little cranium is entirely innocent of the *bump of number*, albeit it may boast of any number of bumps; but generally the little man of five can bring you two, three, or a dozen of any objects you may desire. The work to be done is *the making him able to treat of abstract numbers by the figures which represent them*. This can be done in a variety of ways.

Kind Heaven be propitious and speed the day when the "Kindergarten" shall be universal, for when its pupils shall graduate into our primary grades, they shall be well versed in the smaller combinations, and thus leave more time from the tedious drill for the innumerable things which hand, heart, eye, and mind find to do in a successful school. But till that is the case, we shall have the drill to do ourselves, and the question is, "What is the best way by which to produce the best results?"

Since the interesting auxiliaries of the "Kindergarten" are not at hand, we must improvise something. The little fellows who can't read can hardly stand up before you, book in hand, and recite from it; but tangible objects are the proper things; the rows of desks, the boys sitting at them; the chairs, pictures on the walls, books on the teacher's desk, blocks, beans, sticks, eyes, noses, heads; *any thing but fingers*. Don't let them, on any consideration, use *them*, for there is no habit harder for the teacher to break up than that of counting fingers; *they* are ever present, and it is so easy to do it, that the child keeps at it long after there is no necessity for any help in the matter. Never allow it, but let him see any variety of things before him, handle them, separate them, and count them together. After this, teach him to *think* of something at home which he cannot see; his blocks, marbles, tops, bobs to his kite-tail—anything you can think of; and if your powers of imagination fail, let him help you; ten to one he will brighten up and startle you with something you never thought of. Find out what is a favorite with some dull one, and then look into his eye when you ask him some leading question about it!

Said a teacher to a hopeful mamma in my hearing, "What kind of a boy is that of yours? I have tried for a whole week to obtain some answer to the most simple questions in arithmetic, and have most signally failed: *he did seem dreadfully stupid*, Madam, till, by chance, I happened to say something about horses, and then to my complete surprise, he woke up immediately and answered every one quickly and animatedly; and now I don't have a bit of trouble."

The poor little thoughts were a "wool-gathering," while the teacher was ignorant of his peculiar bent, but the moment she discovered the road he liked to travel in, and was interested in, she found no difficulty with his paces.

There is a kind of despotism about numbers, and, as the pupil advances, he must have all answers of every conceivable combination, contained in the ground principles, at his tongue's end, without stopping to calculate: $4+3=7$; he must know it is 7 in an instant, without thinking it out, $5+4=9$; it is 9, *always*, in a second. As

soon as the question rings out, the return stroke must bring the answer.

I remember once hearing of a saintly old lady who solemnly affirmed that "*she should know a good minister if she heard him in England!*" So the boy at your side must know that $7+5=12$, &c., wherever he hears it, short of the Mountains of the Moon!

"Subtraction" can be developed at the same time with "Addition"; thus, $7-2=5$ because $5+2=7$. $10-6=4$, because $4+6=10$, &c. If they do not see that readily,—and there are some who will be as obtuse and blind as any one-sided politician ever was!—let him take the objects at hand pencils for instance, and manipulate them for himself; here are 10 pencils, from which number he removes 2; he sees 8 remaining, and he thus knows that the two piles together make the number he started with, *i. e.*, $8+2=10$.

After a little practice, he will see them in his "mind's eye," as he now sees them literally. An ingenious device is to presuppose these tables or combinations on the door, the wall, the hand, or the teacher's forehead; their little eyes are looking, their little thoughts are working, and their little lips are giving correct answers, whereas, otherwise, the interest in such dry, abstract food would materially flag.

I do not think too much freedom can be given to the imagination in conjuring up devices to arrest the attention in the study of "Arithmetic." With scholars of the higher grades, the interest is in the nature of the problem presented, and a searching among its intricacies ferrets out the answer. So with our little ones; the questions we give are only problems to them, and we must direct them on the way.

I do not offer this as a "treatise on methods," but simply to show the inexperienced teacher how much depends upon herself, above books and methods, in the successive mastering of the principles of numbers by her young charge. I have only touched upon some few ways by which they may become interested in the study, and by which they may pleasantly fix in the memory what might otherwise prove but an unpleasant and wearisome task.—*New England Journal of Education.*

Methods of Culture.

BY J. BALDWIN.

Memory—Educational Mistakes.

Every where teachers suffer whims and precedents to determine their methods. Exploded follies are perpetuated from age to age. Monstrous absurdities are practiced and even extolled. Vicious methods hang as an incubus upon the profession. It will ever be thus till teaching is placed on the solid basis of science. Attention is here called to a few of the mistakes into which teachers, unguided by principles, are liable to fall.

1. *Crowding Memory* is one of the most baneful mistakes of the profession. This is done in three ways:

(1). Courses of study are overcrowded. We try to spread the child over the whole realm of science. A mere smattering, rather than a well defined knowledge of each branch is the result. "Be content to be ignorant of many things, that you may know some things," is one of the best things said by Dickens. Our courses of study need careful revision. Many subjects must be omitted, and the best for all purposes retained.

(2) Pupils are permitted to pursue too many studies

at the same time. Five, and even six are not uncommon. More than three studies at a time is a serious mistake. Theory and experience alike demonstrate this fact. A multiplicity of studies violates the plainest laws of memory. I may here caution teachers against the opposite error, "a single study." Schools founded on this idea are based on a false theory, and are condemned by all sound educators.

(3) Memory is crowded with countless details, rendering impossible a firm, clear, comprehensive grasp of the subject. True teaching must supplant this common but inexcusable error. Pupils must be led by induction and reduction up to definitions, principles and rules; led to master the great central principles of the subject and to group around these the essentials. Particulars should be used to develop the subject, to illustrate, to apply. Results and processes need to be retained. Details are used as scaffolding, and as such thrown aside. Such teaching gives tenacious memory and the highest culture.

II. *Parrot Teaching* is a most baneful educational mistake, and is alarmingly prevalent in schools of every grade. Bright pupils, who glibly answer all questions in the language of the book, are the pride of superficial teachers and thoughtless parents. It is not strange that such pupils are seldom heard of after they leave school. They are mere human parrots, weighed down by a vicious method that prevents all true development.

True teaching gives independence. Give me the pupil that delves and delves, and who will not rest till he has grasped the *meaning*, who expresses in his own crude language his own ideas. Such plodders become the men and women who move the world. True teaching trains pupils to such habits of study and recitation. Not mere words, but thoughts are stored. Memory becomes vigorous because rationally used.

III. "*Humdrum and Fuss and Feathers*" are extreme educational mistakes. We want neither too little nor too much drive. Dull, insipid, pointless teaching, is a fearful thing. It is the worst of narcotics. It fosters poor memories and poor lessons. The fuss and feathers teacher goes to the opposite extreme. He makes a show of doing much, but in reality accomplishes little. He hurries and confuses his pupils, and thus renders good results impossible.

Avoid both mistakes. Awaken and sustain an intense interest. Manage to have pupils forget themselves and become absorbed in the subject. Give the pupil time. Train him to systematic and determined effort in remembering and solving. Stimulate him to be plucky and to conquer by an indomitable will. One recitation thus conducted is worth a score of the "humdrum" or of the "fuss and feathers" kind. Such teaching develops power to achieve. It is the kind of teaching demanded by the spirit of the age.

Footprints of the Great.

It is a fortunate thing that we have the lamp of biography to bring into view the footprints of the great men who have gone before us. Every small man need not try, of course, to stride along in the footprints of a giant. But still every one has some peculiar talents which it is his business to put out to the best advantage; every one has gifts which he ought to cultivate and employ to a great end. And from those who have preceded him on the same path and employed similar gifts with illustrious success, he may glean much wisdom to guide his own course. If he knows not how

to encounter some small difficulty he may inquire what weapons they wielded for a like purpose, and perhaps he will wield them with a like success.

Energy is the powerful weapon which achieved victory for all great men. Whether a man is great in war, in politics, in science, literature or the fine arts, he never would have been so if he had not been a man of energy; and moreover, a man of concentrated energy.

In literature, the ancients addicted themselves to one species of composition; the tragic poet appears not to have entered into the province of comedy, nor, as far as we know, were their historians writers of verse. They devoted their faculties to one object, just as the rays of the sun may be directed on a single point with a hundred-fold intensity through the lens of a burning glass; and to this concentration of energy is chiefly owing their general superiority over the moderns. This is the great principle of constancy in one occupation which is partly impeached in the well known maxim: "Beware of the one-book man!"

Now, who are the one-book men? I believe that they comprise many of our great names. Everyone knows how assiduously Demosthenes went on transcribing his Thucydides. Then, St. Chrysostom, who to my mind was by far the greatest orator that ever lived, spent two years in a solitary cavern, reading and meditating on the Holy Bible, so that we are told, he knew it perfectly by heart. Among a hundred more recent instances, there is that of Chatham, who studied Barrow's sermons so often as to repeat them all from memory. There is scarcely any great literary man who has not been particularly addicted to some one book. Here they established a vantage ground where they had a firm footing and a secure fortress.

Everyone, therefore, who engages in literary composition, if not naturally drawn to choose some superior model, should learn to do so from such great examples. But he should determine for what purpose he will take up one especial book. This would be the best for its admirable style; that for its depth of thought; another for the wisdom or science it contains; and in all cases the writer chosen should be the very best of his kind. Then the mind will acquire a decided and vigorous tone—the absence of which is so commonly felt; and it will be kept from that vacancy, inertia and dissatisfaction, which are produced by the practice of desultory reading. This habit indeed will give the fulcrum on which, with the lever of his own peculiar talents, each one will be able to move the world of thought.

But this one book system implies a constancy which has in it something heroic; and therein lies the energy, and therein lies the greatness of the great.

But above all is energy required in the act of composition. It is mere nonsense to say that great geniuses set down their thoughts without labour. It is true, perhaps, that there have been one or two cases where wonderful powers of mind have been united to as wonderful powers of expression, and where thoughts flowed out almost spontaneously in a torrent of eloquence. It was so with Shakspeare in modern days, and it was so with Homer in the olden time. But those instances of energy of thought and expression without effort are remarkable exceptions to the general rule. We hear very differently of the vast majority of famous writers. Take the poets: Euripides wrote one line in the hour; Ariosto wrote some stanzas descriptive of a tempest in sixteen different ways; Petrarch made fifty-four alterations in a single verse; even Byron, whose words rush along in an irresistible stream, displays very many erasures in his manuscripts. If this be the

case with poets, it is even more so with other writers. To go no further back than our own time, Lord Brougham wrote one of his speeches twenty times over. Bulwer Lytton says it was with "incredible labour" that he composed his first fiction. Dr. Newman is nearly always ill after the labour of prolonged composition. Gibbon, the great historian, composed his memoir eight or nine times, and after all left it unfinished. These are but a few instances out of many.

Now, what an extraordinary amount of energy is displayed in all this labour. A weak spirit would be daunted, and give up the undertaking, or hastily throw out some crude production to meet with a similar fate to that of many a poet,

"Whose sweet melodious works have sunk
To wrap up sausages, or line a trunk."

But the great writer has before his mind a grand ideal, which he labours hard to express in language commensurate to its loftiness. He strains intensely after this ideal; but all the time his labour is an enthusiasm, and though at times his mind may be wearied, it is ever borne up with the inward consciousness of power. The struggle between the mind and the idea is often long and severe; often they "wrestle as in a war-embrace," but in the end the patient energy of the manly spirit obtains the mastery, and thought becomes embodied in words.

A Journey to Grammarland.

There was once a little boy who had a great desire to please his mother, and she was very anxious for him to learn grammar. To accomplish this, they worked together with all their zeal; but it was very hard. To learn to speak requires much time; but one accomplishes it, and with pleasure too. When we say "ossee" to the baby, showing him a horse, and he repeats it, everybody is delighted; his mother rewards him with a look and a smile full of tenderness; his father embraces, with a shout of joy, his fat and laughing form; and the little fellow vigorously brandishes his arms and his legs, in order to show that he is happy too.

That is not the way with the grammarians. Those poor gentlemen never laugh, and they have, alas! something more important to do than to kiss little children. With them it is no longer "ossee"; but we are in the presence of "horse, a common substantive, third person, masculine gender, singular number, forming its plural by addings, and whoever can't learn that is a little dunce!"

It is clear that there is no fun in that.

One beautiful summer morning, the mother and the little boy had risen very early to review carefully the page of grammar which he must recite that day. The sun, which made the dew-drops in the grass glisten like diamonds, had entered the room through a corner of the window, and seemed to invite them to come and see how beautiful it was out-of-doors. The red breasis, the tomtits, and the linnets called them with sweet songs from all the trees of the garden; and the large rose-bush which grew behind the house, agitated by the morning breeze, strock the window-panes which its bunches of flowers.

Obedient as he was, the dear child had not courage enough to resist this universal invitation. His legs, which inoved about in spite of him, asked to carry him

"Grammar according to the Maccan System; or, a Journey to Grammarland." Adapted from the French, by Père et Fille.

into the garden, and his bright eyes could not do other wise than quit the book sometimes to play with the sun amid the flowers. The mother herself stifled a sigh, and it evidently cost her a great effort to keep the poor little boy in the room, when everything called him into the open air. But she could not think of yielding to such a weakness, for the master would soon be there; and when he had put on his spectacles, and assumed his imposing air, he was not a personage to be sneezed at.

"Mother," said the child, all at once, "please explain this phrase; I do not know what it means, and I am afraid I will never learn it."

He was studying the modifications of verbs, and this is the sentence which he had to commit to memory: "*Number is the form which the verb takes to express its relation with unity or plurality.*"

His mother took the book in her beautiful white hands, and her pretty eyes remained fixed with fright upon the phrase.

"Ah!" said she to herself, "I thought I used to understand the meaning of number in verbs; but now it seems to me I do not know any thing about it."

She remained immovable, her mind plunged into a profound abyss, while her little son continued to interrogate her with his looks, with that simple confidence of children who think nothing too difficult for mother.

Just at that moment the door opened very softly, and an old friend of the house entered without knocking. He was a round, little man, with a merry, fat face, still fresh under his white hair, and with lively, blue eyes, filled at the same time with mischief and with goodness. Many tales are told about him. Often he disappeared for whole months, nobody knew where; then he suddenly reappeared, and no one dared to ask him where he had been. But it was rumored about that he was a sorcerer, and that he had at his command a magic chariot in which he could fly to countries that no one had ever seen. The little boy loved him very much, because there was no one like him to amuse children; and the mother was delighted every time she saw him, because he often aided her in her difficult task of instructing the little boy.

As soon as she saw him, she held out the book without saying a word, indicating with her finger the phrase which she found so difficult to understand. The little man had hardly looked at it, when he frowned and anger flashed from his eyes. He loved children so much that he became very angry when any one wronged them, and in those moments of rage a sometimes went so far that he actually became funny.

"Who wrote that?" cried he, pushing the book from him, as if it were something odious. "I don't know what keeps me from going right through the window to twist his neck!"

The good old man, in his exasperation, had let out his secret.

He appeared to reflect a few moments.

"Listen," said he, at last; "since anger has made me boast of what I can do, I will place at your disposal the power of which I, like a goose, have spoken. I have just returned from a journey which has fatigued me much, and it will cost me not little to be off again so soon; but it shall not be said that I have left you any longer at the mercy of barbarians. Come with me. I will conduct you to Grammarland. It is a country where little children can amuse themselves as well as elsewhere, when they enter it in the right way."

So saying, he waved his hand. The window opened of its own accord, and the branches of the rose bush parted to let pass a chariot of mother-of-pearl, drawn by two large swans, white as snow. The little man

lightly jumped into it; and, having invited the mother and little boy to a seat by his side, he set out with them through the air.

"My dear child," said he, when they had lost sight of the earth, "what we wish to teach you when we place a grammar in your hands is much more important than you now think, and I charge you to open well your eyes and ears when we arrive in Grammarland.

"When you came into the world, you could utter only groans and confused cries, similar those of animals. Those who are born deaf remain so all their lives. It is impossible to teach them to talk, because the words which we pronounce before them cannot enter their ears; and, for want of exercise, their mouths are able to produce only a sort of groaning or muttering.

"You know how to speak already, thanks to your mother, but you are still too young to understand what an immense service she has rendered you, and how much time and labor were spent by the first men in their efforts to transform into articulate language the coarse sounds which formerly came from their lips.

"Don't ask me any questions: your eyes have said enough, and I knew that I must explain the word articulate. In order to do so to your satisfaction, I must give you a short lesson in natural history.

"Touch with your finger that little ball which you have in the middle of the neck, and which is called Adam's-apple—why, I know not, though. Have you found it? Well, keep your finger on it.

"Now, open your mouth, wide, and drive the air from your chest with the least possible noise. What do you feel under your finger? Any movement?"

"Very little."

"Try again, with your mouth wide open, and imitate the cry of a baby. Don't you feel the little ball tremble under your finger this time?"

"It is in that place that the sound of the voice is produced, thanks to two membranes placed in the interior of Adam's-apple, between which the air which comes from the chest passes, and which are tight or loose, according as we wish to make much noise or none at all. A chord tightly stretched gives forth a sound when struck, but none when it is loose. That is precisely the case with the membranes of Adam's apple. They are called the vocal chords, one of the prettiest names ever invented by those whose business it is to designate the innumerable parts of which our bodies are composed.

"The vocal chords exist also in animals, which, like us, have lungs, and a windpipe through which the air comes and goes. They have a voice as well as we; but it is used by them only to utter cries, because the noise goes from their mouths through nearly the same channel for each of them.

"Man has learned to break and bend his voice at the moment when the sound passes into his mouth, by disposing his lips, tongue, and teeth in a thousand ways, so that it is modified and transformed into a series of sounds very distinct from each other. Just now, when you had your mouth wide open, the sound which came from it was the same all the time, because it encountered nothing which could bend or modify it. It remained just as it was formed in the passage of the air through the vocal chords. Amuse yourself by pronouncing, very slowly, *do, re, mi, fa, si, la*; by paying attention, you easily see that your lips dispose themselves differently to pronounce those different sounds. They do that of themselves, because they are accustomed to it, like well-trained horses that promptly go of their own accord to the place which they ought to occupy; but ask your mother how much care and patience their apprenticeship has cost her.

"That is, dear child, what is called articulate language. The name articulate is given to every thing that can be bent, breaking itself, so to speak, into several parts, just like your fingers, for example, which divide themselves into three parts when you shut your hand. And now, if any one tells you, in your reading, to articulate your words well, I hope you will know what he means, and that you will take much care to profit by this great advantage which you have over animals.

"The advantage would not be so very great if it was only an affair of music is not so good as that of the little linnets in your mother's garden; but it enables us to clothe, in words easy to be known, the ideas within our heads, and to take them out to show them to others. This is of incalculable value.

"What is an idea? It is an image, or picture, in the rigorous sense of the word. That is what it signified among the Greeks, from whom it came to us.

"When you say mother, house, horse, those three words which you pronounce bring before the eyes of those who hear you three different pictures which were drawn in your head at the moment when you spoke. It is true that those pictures are sketched so rapidly that a thoughtless little boy may not see them; but by paying attention, you will soon learn to recognize them. Two men that speak together are like two children who lend each other their pictures; for it is just that which we do when we exchange our ideas, as we say.

"All our images are not of the same nature as those of which I have spoken. Those are sensible and material ideas—ideas or pictures of material objects, or things that we can see or handle, as a house, a horse. You are more fortunate than many others, dear child; you do not want for any thing. I am sure, however, that you are sometimes made to wait for your breakfast or dinner, and in those moments you have a great desire to eat. If I pronounce before you the little word hunger, which has made many unfortunate ones tremble, it will awaken in you the remembrance of what you then experienced. Hunger is not a thing whose picture we can draw, and yet this word conveys to you an idea or description of the state in which you find yourself every time you are made to wait for dinner.

"I will not undertake to explain to you now all the kinds of ideas that we express by words; we will come to that when we engage in the special study of words. It is enough for you to know that a word could not exist if it had not been created expressly to represent some idea, and that should teach you never to employ a word that does not convey some idea to you.

"But man was not satisfied with finding words with which to clothe his ideas. He studied how to catch and tame, so to speak, those words which flew away into the air as soon as spoken, and how to make them visible so as to preserve some trace of the ideas which he could not retain in his memory, and so as to converse with those who might be out of the reach of his voice.

"That means was writing, an invention almost as wonderful as that of speech; and the little boys who grumble when learning to write their letters do not know how much gratitude they owe the men of genius who invented those marvelous signs, whose combination represents to our eyes the ideas that their combined sounds represent to our ears.

"The alphabet has the appearance of something of very little importance. To make curves and straight lines, oh! how tiresome! Well, those curve and straight lines are the most powerful instruments which human intelligence has yet given us. By their aid, the labors of all men, in all ages and regions, may be kept for each one of us, and the labor of each one may be a benefit to all. If any one should write what I am

saying at this moment, the little boys on the other side of the world might profit by it, provided it should please their mothers. What are our greatest writers compared to the creators of the alphabet? The former are the tiles of the roof; the latter, the stones upon which the house is founded. The first shine in the sun and live in the air, while the others lie buried in obscurity; yet it is the latter that carry all.

"Once in possession of speech and writing, man can clearly explain his ideas. He makes for himself rules, groups into distinct families the words scattered in his memory, studies the art of speaking and writing, and the reign of grammar commences—not to make little children despair, as you have imagined, but to ennoble and fortify them, by teaching them to make themselves master of their ideas in order to express them well.

"You ought to understand now, my little friend, that grammar is an important science, one which has cost much trouble to create; and the children of to-day ought to think themselves very fortunate to find it ready made for them when they come into the world. Instead of becoming impatient over the difficulties which they encounter, they ought to think of the much greater ones which those who made grammar met and conquered, and they ought to thank them with all their heart, and try to profit by their works.

"Speech is one of the principal things that distinguish men from brutes, and it is also by language, much more than by birth and fortune, that men are distinguished from each other. Whether you are poor or rich will make little difference with a well-educated man. It is by hearing you speak that he determines whether you are in his circle or not. If you wish to count for somebody in this world, it is necessary to prepare yourself now, by forming good habits of language; and the best way to form them is to go bravely to the rules which teach them, however dry and uninteresting they may appear to be.

"That is not all. In taking advantage, for your instruction, of the work and painful labors of the first men, you ought to think that there are many children who have not the good fortune, like you, of tiring themselves over grammar, and who will never know what you are learning. Grammar is as important to them as it is to you. This great benefit of a regulated language is a common heritage left by our ancestors to their descendants, and it is not right that any one should be deprived of it. Think of this when you are grown, and try to remedy the injustice of lot or condition in life. Think of this even now, when you are inclined to feel jealous of the little boys who run in the street, while you are kept in the house studying your grammar. They ought to be jealous of you, for you have your part of the great inheritance, and they are losing theirs. Study your grammar with diligence, and try to invest it with a lively interest. It teaches the right use of languages. It teaches us to speak and write correctly; to think and reason correctly. All success in the higher and nobler walks of life is largely dependent upon that knowledge which the study of grammar gives us. As it teaches purity of speech, it leads to purity of thought, of heart, of action, of life. Remember that

Words lead to things; a scale is more precise;
Coarse speech, bad grammar, drinking, gambling, vice.

"He who is refined in speech is more apt to be refined in heart and in life than the man of coarse language. The study of grammar is, then, an important element in securing enlightenment, refinement, and purity of life."—*National Teachers' Monthly*.

JOHN M. RICHARDSON.

School Teachers' Association.

The second quarterly meeting of the members of the Protestant School Teachers' Association was held last evening, Prof. McGregor in the chair. M. Weir opened the proceedings with prayer.

The Secretary read the minutes of the previous meeting, and also the minutes of the Council held the same evening.

On motion of Mr. Hicks, M. A., seconded by Miss Clarke, Mr. R. Weir was appointed Treasurer *pro tem*.

Principal Hicks made a few remarks on the art of teaching composition, a subject treated in a paper read at the previous meeting by Mr. F. W. Hicks; he dwelt upon its importance in cultivating correct habits of thought, and mentioned that teachers generally neglected teaching composition as an unpleasant task, one reason for display in public; again, children disliked it, as they could not perceive their progress; further, and a very great reason,—it gave a large amount of trouble to the teacher; and in fact, it was quite certain that it would be an instrument of great benefit, which would lead in their schools to the acquirement of sound education.

Prof. Mills, of the Normal School, remarked that English-speaking people were not generally gifted with facile expression of their thoughts, and held that great writers were at present somewhat ravenous readers. He ascribed neglect of composition to lack of thoughts, and was of opinion that when a pupil had no real thoughts to write, it was useless to bore him with the trouble of preparing a composition. The power of observation should be cultivated; and the study of the meaning of new words was profitable by widening the range of vocabulary.

Prof. McGregor observed that the choice of a proper item was a highly important matter; at the time of that event he had selected means of meeting the Fenian invasion, and the results had been so satisfactory as to surprise and please him, the topic being one in which the pupils were thoroughly interested.

Principal Hicks—With regard to the subject, mistakes in teaching, stated as great injury was frequently done through want of experience on the part of the teacher, the importance of careful preparation of the work was evident. One of the most serious mistakes for any person in life was to place oneself in a position for which one was not fitted by nature; this mistake was not rarely committed by people who adopted the teachers' profession. The teacher should possess—first a love of children, and secondly, a decided liking for a teacher's occupation, and thus fortified, he had some chance of battling successfully with the trials well known to all present. No one should become a teacher until he had carefully counted the cost, and one of the most common mistakes made was to look for immediate results in the work of education. He (Mr. H.) had committed the error when he took charge of his first school, which was in a very disorganized condition. The teacher, further, should not be of the kind who considered teaching as an unpleasant task. Another, and a very serious mistake, consisted in the giving of special attention to a few scholars, because they exhibited that peculiar aptitude which a teacher was always pleased to find amongst the scholars placed under his care, or such attention to the most advanced, and therefore the likeliest to attract attention. Another, and a frequent mistake lay in the giving of too much attention to the teaching of a subject for which the teacher might have a liking, and to which he might have devoted a large amount of his own time, because he felt pleasure in so doing. Many young instructors undervalued the subjects of primary importance because they were elementary, and they imagined that they were promoting the benefit of their pupils when they taught something of which they had heard as an advanced branch of knowledge, without considering its fitness for the young. One would choose mathematics; another, a scientific enquiry of another nature, &c, while others hit upon grammatical construction, a hobby which they rode to death. Teachers often neglected the great truth, that all children were not alike in natural capacity, though every person, ordinarily speaking, must be aware of this fact. In this connection also came the habit, because a teacher was well acquainted with his subject, of going into the class room without preparation; this was a very fatal as well as a common error; preparation or every lesson was essentially necessary. Instruction was again, at times, given in such a way as to leave no chance for individual exertion, as far as pupils were concerned; he

was well aware of the advantages of education as received from the present mode of teaching as compared with the dead system which prevailed in all schools years ago; [the evils were sufficiently obvious and first, the weakening of the system, removing from the young the opportunities of ascertaining to what extent they might be able to rely upon their own exertions in pursuing their education in future life; and another, the increase of a teacher's labor, as he would become so accustomed to constant repetition and explanation that he imagined that nothing could be done without his assistance. (Applause.)

Mr. Humphrey, the Secretary, in the course of the desultory debate which followed, favored whipping in schools.

Miss Cunningham sang, "I sent a letter to my love," loudly applauded.

Mr. Weir read a paper on the tendencies of the profession; and Miss Rexford gave an amusing selection of anent donation parties, and the proceedings closed at 10.30 o'clock.

McGill University.

The Corporation of McGill University have pleasure in acknowledging the following donations to the Faculty of Arts, during the quarter ending January 26th, 1876:—

TO THE LIBRARY:

From the Government of the Dominion of Canada—Statutes of Canada, 1875, English and French, 2 vols., 8vo.; Sessional papers, No. 2 to vol. VIII, 8vo.

From the Government of the Province of Quebec—Journals of the Legislative Assembly, sessions of 1874-75, 8vo.

From W. C. Harris, Esq.—Sketch of the Geology of Moray, 8vo.

From W. G. Beers, Esq.—Examination Papers of the Royal College of Surgeons of England, 19 pam., 8vo.

From Principal Dawson, L.L.D.—The Dawn of Life. 8vo.

From S. S. Laws, Esq., M.D.—A Thesis on the Dual Constitution of Man, or Neuro Psychology. Pam., 8vo.

From Dr. Wells Williams—King Pao, or Peking Gazette, Sept 18, 1875. One copy.

From the Boston Society of Natural History.—Proceedings, vol 17th 8vo. Do. Occasional Papers, No. 11 8 o. paper.

From the Secretary of War, Government of Washington.—Annual report for the Fiscal year ending June 30, 1875.

From the Smithsonian Institution—Annual Report of the Regents for 1874, 8vo.

From the Institution of Civil Engineers, London, Eng.—Minutes of proceedings, vols. 41 and 42, 8vo.

From the University of Aberdeen, Scotland—Catalogue of the library of the University of Aberdeen, 3 vols., roy., 8vo.; Aberdeen University calendar for the year 1875-76, 1/2 bd., 8vo.

From the McGill College Book Club—97 vols, comprising recent publications on various subjects.

From the Geological Survey of Pennsylvania—Report of progress for 1874-75. 3 pam., 8vo.

TO THE MUSEUM:

From W. C. Harris, Esq.—Specimens *Orthoceras* and *Colymene*, Utica Shales.

From A. R. C. Selwyn, F.R.S.—Specimens of Garnet, from Stickeen R., British Columbia, and Indian Pottery from British Columbia.

From William MacCulloch, Esq., Montreal.—Collection of shells and Crustaceans from the South Pacific.

From J. W. Spencer, Esq., Ba. App Sci.—Specimen of *Diety onema*, from Hamilton, Ont.

From W. J. Morris, Esq., Perth.—Specimens of *Eozoon*, from Rurgess, Ont.

POETRY.

The Glory of God in Creation.

Thou art, O God, the life and light
Of all this wondrous world we see:
Its glow by day, its smile by night,
Are but reflections caught from thee:
Where'er we turn thy glories shine,
And all things fair and bright are thine.

When day with farewell beam delays,
Among the opening clouds of even,
And we can almost think we gaze
Through golden vistas into Heaven;
Those hues that mark the sun's decline,
So soft, so radiant, Lord, are thine.

When night, with wings of stormy gloom,
O'ershadows all the earth and skies,
Like some dark beautiful bird, whose plume
Is sparkling with a thousand dyes;
That sacred gloom, those fires divine,
So grand, so countless, Lord, are thine.

When youthful Spring around us breathes,
Thy spirit warms her fragrant sigh;
And every flower the Summer wreathes,
Is born beneath that kindling eye;
Where'er we turn, thy glories shine,
And all things fair and bright are thine.

Aspiration.

Have we not all, amid life's petty strife,
Some pure ideal of a nobler life
That once seemed possible? Did we not hear
The fluttering of its wing, and feel it near,
And just within our reach? It was? And yet
We lost it in this daily jar and fret,
And now live idle in a vague regret:
But still our place is kept, and it will wait
Ready for us to fill it, soon or late.

No star is ever lost we once have seen;
We always may be what we might have been.
The good, though only *thought*, is life and breath:
God's life can always be redeemed from death,
And evil in its nature is decay,
And any hour may blot it all away;
The hopes that, lost, in the far distance seem
May be the truer life, and *this* the dream.

Endurance.

How much the heart may bear, and get not break!
How much the flesh may suffer and not die?
I question much if any pain or ache
Of soul or body brings our end more nigh:
Death chooses his own time; till that is worn
All evils can be borne.

We shrink and shudder at the surgeon's knife,
Each nerve recoiling from the cruel steel;
Whose edge seems searching for the quivering life:
Yet to our sense the bitter pangs reveal
That still although the trembling flesh be torn,
This also can be borne.

We see a sorrow rising in our way,
And try to flee from the approaching ill:
We seek some small escape; we weep and pray:
But when the blow doth fall, our hearts are still:
Not that the pain is of its sharpness shorn,
But yet it can be borne.

We wind our life about another life—
We hold it closer, dearer than our own:
Anon it faints and falls in deadly strife,
Leaving us sad, stunned, sickened and alone.
But ah! we do not die with those we mourn:
This also can be borne.

Behold, we live through all things—famine, thirst,
Bereavement, pain; all grief and misery.
All woe and misery; life inflicts its worst
On soul and body—but we cannot die:
Though we be sick and tired, and faint and worn,
Lo! all things can be borne.

What is Life?

A little crib beside the bed,
A little face above the spread,
A little frock behind the door,
A little shoe upon the floor.

A little lad with dark brown hair,
A little blue-eyed face and fair,
A little lane that leads to school,
A little pencil, slate and rule.

A little blithesome, winsome maid,
A little hand within is laid;
A little cottage, acres four,
A little old-time household store.

A little family gathered round;
A little turf-heaped, tear-dewed mound;
A little added to his soil;
A little rest from hardest toil.

A little silver in his hair,
A little stool, and easy chair;
A little night of earth lit gloom;
A little *cortège* to the tomb.

OFFICIAL NOTICES



APPOINTMENTS.

PROVINCIAL SECRETARY'S OFFICE.

Quebec, 1st February, 1876.

His Excellency the Lieutenant Governor has been pleased by order in Council dated the 2th January last, to appoint the Honorable Gédéon Ouimet, Q. C., Superintendent of Public Instruction for the Province of Quebec.

Ministry of Public Instruction.

SCHOOLS COMMISSIONERS AND TRUSTEES.

Quebec, 2nd February, 1876.

The Lieutenant Governor has been pleased, by order in council, dated the twenty eighth January, and in virtue of the powers conferred on him by the 48th and 136th clauses of the consolidated statutes of Lower Canada, make the following appointments of Schools Commissioners and School Trustees, to wit:

SCHOOLS COMMISSIONERS.

County of Bellechasse, Saint Lazare.—Mr. F. X. Lemieux, *vice* Mr. Louis Goulet.

County of Berthier, Saint Michel des Saints.—Mr. Théodule Migneron, *vice* Mr. Thadée Mirville Déchêne.

County of Compton, Clifton East.—Mr. Frederick Williams, *vice* Mr. William Reed.

County of Gaspé, Baie sud.—Mr. Joseph Eden, senior, *vice* Mr. William Reed.

County of Gaspé, Baie Sud.—Mr. Joseph Eden, senior, *vice* Revd. J. P. Richmond.

County of Gaspé, Anse of Valeau.—Mr. François Desjardins, *vice* himself.

County of Hochelaga, Village Delisle.—Mr. Hubert Morin, *vice* Revd. F. L. T. Adam.

County of Megantic, Nelson.—Mr. Robert Smith, *vice* Mr. John Bain.

County of Maskinongé, Saint Didace.—Mr. Alexis Trappier, vice Mr. Joseph Allard.

County of Ottawa, Sainte Cécile de Mashan.—Mr. George Vaillant, vice Mr. Elia Rosetto.

County of Stanstead, Barford.—M^r. Moses P. Haw and Eugène Ross, vice Messrs. Moses Drew and William Wright.

County of Vaudreuil, Sainte Marthe.—Mr. Antoine Meloche, vice Mr. Théodule Desjardins.

County of Gaspé, Rivière à Marte.—Messrs. Louis Roy, Isaac Gaze, Joseph Gaze, William Mallowney and Jean Baptiste Morin

SCHOOL TRUSTEES

County of Gaspé, Percé.—Mr. Thomas Kane, vice Mr. Thomas Mahon.

MUNICIPALITY LIMITS.

The Lieutenant-Governor has been pleased, by order in council, dated the twenty eight January, 1876, and in virtue of the powers conferred on him by 38th clause of chapter 15 of the consolidated statutes of Lower Canada, to make the following changes in the limits of school municipalities, to wit:

Village of Saint Jerome, county of Terrebonne.—To assign to it for school purposes the same limits as those given to it for municipal purposes by the 34th Victoria, chapter 34.

Les Crans, county of Montmorency.—To detach from the municipality of Saint Anne the three small concessions known as "Les Crans," and to erect them into a distinct school municipality under the name of the "Municipalité des Crans."

Also, by another order in council dated the first of February, in virtue of the powers conferred on them by chapter 15th of the consolidated statutes of Lower Canada, the Lieutenant Governor has been pleased to make the following alternation to wit:

To annex the St. Maurice Forges Station to the municipality of St. Etienne, in the County of St. Maurice.

The Report of the Chaplain of Newgate on Education and Crime.

(Standard, Jan. 5.)

The report of the experienced Ordinary of Newgate, disparaging the value of purely secular education as a check on crime, will be regarded with some surprise by that large number of intelligent persons who are wont to take received theories, and especially current interpretations of ascertained statistics, for granted, without bringing their own minds to bear on the subject. It is a common-places among the advocates of education that a knowledge of reading and writing tends to discourage theft and make men outwardly if not in heart honest; and scarcely any of them have ever cared to consider that the idea is so monstrous in itself, there being no sort of traceable connection between the supposed cause and effect, that it should not be accepted without the closest scrutiny of the figures which profess to prove it. We grant that the majority of criminals are illiterate. This is the case in America as well as here; but in America there is another fact made equally apparent by published statistics which serves to explain the phenomenon, and might have put English observers on their guard against rash inferences. The illiterates of America are chiefly negroes and foreigners; and these also form a disproportionately large element in the criminal class...

The instructed savage is so much more dangerous an enemy than the utterly ignorant and brutal one that we may well doubt whether the total effect of secular education upon the anti-social class would not do society more harm than good. The habitual criminals might be fewer; but they would be more clever, more powerful,

more capable of united action. It is their dull brutality, and especially their utter incapacity of union, which has hitherto rendered them so weak. Were the scoundrelism of London to be combined under the leadership of a few clever chiefs—as it probably would be if the scoundrels were educated to appreciate the value of discipline and union—it would be too strong for the existing repressive power of society; it could overpower the police and resist the troops, it could plunder the town and levy blackmail on all whose lives and dwellings it spared; it could only be crushed after street fights as desperate as Paris has ever seen, and would for years afterwards be able to render the streets unsafe by night and compel us to keep up twenty times our actual police force. Such, all men who have studied the facts admit, would be the effect of combination among the dangerous or anti-social classes of London; and if secular education reclaimed a portion of them, it would give to the rest precisely this power of combination which as yet they pre-eminently lack. We cannot therefore afford to educate them unless we educate them in sound morals. And we can find no basis, we can offer no motive for sound morality except a religious one. The utilitarian theory has no value except for well-disposed citizens; the greatest happiness of the greatest number has no weight with the hereditary enemies of society. You can teach even the children of criminals and vagabonds to do right and love justice for the sake of those who loved and suffered for them, or in deference to the power of One who can punish crime more surely and severely than any earthly judge; but you cannot teach them to be good and honest, to suffer hardship and work hard, forego pleasure and resist temptation, because it is for the common interest, or even for their own remote interest, that they should do so. They prefer present and selfish enjoyment; and why should they not? How many of their betters deliberately sacrifice their own health and the happiness of their families to immediate indulgence? How expect the educated child of the degraded classes to be nobler, wiser, manlier than the educated children of cultivated parents; or to refrain from seeking wealth and sensual gratifications where education has made him clever enough to discern ways of doing this without incurring immediate punishment?

This is not the aspect of the question on which the Ordinary chiefly dwells, but his argument forcibly confirms it. There is a large class of educated men who are practically what secular education professes to make the children of the lower orders—instructed but infidel, familiar with all the principles and rules of morality, but indifferent to the motives supplied by religion. In larger and larger numbers the less lucky or less clever of this class are finding their way to our prisons. They are not criminals by profession—in the present state of things they see that this would not answer; but they are not scrupulous in their daily dealings. They generally avoid actual theft and fraud punishable by law, but they are so accustomed to dishonest tricks not so punishable that a strong temptation, or a chance of great gain with small risk of detection, induces them to overstep the frontier. There are organised frauds carried on a scale which argues the existence of widespread depravity among clerks, shopmen; and servants; there are traders who live by inducing these people to cheat their employers; to sell goods at a low price which may not be missed; to give them a dishonest preference in dealings; to run up accounts in their employer's names on which they are allowed a commission; all these villainies go on on a large scale; and men connected with them are allowed to retain the commercial and social position of honest traders. In far higher ranks frauds not less infamous in

themselves, and infinitely more atrocious in their magnitude and the ruin they inflict, are committed by wealthy financiers in league with the Ministers of bankrupt States or the promoters of swindling companies; and even when the frauds are detected those concerned with them are not refused credit or business by the honest merchants of the city, are not excluded from the society of men who claim to be honourable gentlemen and even devout Christians. This has been the result of the education and enlightenment of the nineteenth century—an education and enlightenment eminently secular. And if such widespread demoralisation has been the result of the highest secular instruction—if such is the fruit of the deepest secular culture—what moral influence can we expect the rudest and simplest apparatus of the same cultivation to effect in the most stubborn and unfavourable soil? The *Goliath* and the *Warspite* have shown what religious education can do for the worst material; Mr. Jones's report tells us what secular culture can do for the most promising.

Time and Time-tellers.

THE "OLD" AND "NEW STYLES" OF DATES.

In a little volume with the title, "Time and Time-tellers," just published by Robert Hardwicke, of Piccadilly, London, Mr. James W. Benson gives us a store of information, not only as to the constitution and manufacture of a modern watch, but as to the history of watches and clocks in general, and of those "time-tellers," more or less artificial, which have been used from the dawn of civilization, and, indeed, the various modes and plans which have been adopted by the Babylonians and other primitive nations for the reckoning of time. In fact, it is an encyclopædia of knowledge on the subject of Time, and of the contrivances by which the human race have "kept their eye" upon his movements. If it is not in the strictest sense a scientific treatise at all events it may claim the merit of being a well-written popular account of a subject which is, or ought to be, of interest to all.

The work very naturally divides itself into two parts, the former, historical and strictly retrospective; the latter, explanatory of the mechanism of modern watches and clocks. We will not accompany Mr. Benson into any of his remarks about the flight of time, its beginning and its end, since these touch on questions about which it is useless to speculate; but we cannot omit to direct attention to his account of the rise of horology, and the earliest conventional divisions and modes of computation of time. To his account of these, however, he might have added the primitive plan mentioned by Herodotus, of cutting notches in sticks day by day during distant voyages, and the habit of counting by fives to which both Homer and Æschylus allude. But there is to be found in Mr. Benson's pages much that will be new even to the well-informed reader. Thus, with regard to the difference of the English and American day from that of other nations, he reminds us that while with us the new day commences at or from twelve at night, the Jews, the Greeks, and the Italians reckon from sunset to sunset, and the Persians from sunrise to sunrise. But still even among us there is another computation for the astronomical and nautical day, which counts from noon to noon, and is reckoned as consisting of 24 hours, and not of twice twelve. In respect of the days of the week, of the lunar and solar month, of the old legal year (commencing from March 25), of Leap year, of the "Old Style" still kept up in Russia, and of the new, or "Gregorian Style" introduced into England and America little more than a century ago—some of Mr. Benson's historical allusions are worth noting;—for instance, where he mentions the dislike with which the English, in George II.'s reign, viewed the introduction of the Gregorian style:—

The earth's revolution round the sun being made in 11 minutes and 11 seconds less than 365½ days, which minutes in the course of 16 centuries required to be taken into consideration, Pope Gregory XIII., in A. D. 1582, took off ten days by making the 5th October the 15th. The Gregorian time, however, was not introduced into England till 1752, when the error amounted to about 11 days; so 11 days were subtracted from the current

year, which was thus made to contain only 354 days, much to the indignation of the illiterate poor of that time, who clamored loudly, and assembled in great mobs to testify to their sense of the great injury inflicted upon them, crying, 'Give us back our 11 days.' One of Hogarth's prints of 'The Election' exhibits a paper containing this very inscription. The fury of the populace at being robbed of its precious time availed not; the day after the 2nd September, 1752, was made (by act of Parliament) the 14th of September, and from that time dated the "New Style," since which the year has been almost exactly correct.

MISCELLANY.

Good Advice for the Young.—Avoid all boastings and exaggerations, backbiting, abuse, and evil speaking; slang phrases and oaths in conversation; depreciate no man's qualities, and accept hospitalities of the humblest kind in a hearty and appreciative manner; avoid giving offence, and if you do offend, have the manliness to apologize; infuse as much elegance as possible into your thoughts as well as your actions; and, as you avoid vulgarities you will increase the enjoyment of life, and grow in the respect of others.

—Blunders in Behavior Corrected.

—This sample of the poetry of science gives us the offspring of a chemical wedding:

Messrs. Water and Oil
One day had a broil,
As down in the glass they were dropping.
And would not unite,
But continued to fight,
Without any prospect of stopping.

Mr. Pearlash o'erheard,
And quick as a word,
He jumped in the midst of the clashing;
When all three agreed,
And united with speed,
And Soap came out ready for washing.

Trifles.—The world is made up of trifles. The grand movements of great events, and the changes of Empires, are founded in causes, very generally, which would be pronounced trifles by the world. Yes, "trifles light as air" have led to some of the most important discoveries we have. The fall of an apple gave Newton the clue to gravitation; the rising up of the lid of a tea-kettle gave us our railroads, steamboats, ocean steamers, and a thousand other things, not to speak of the press—that, combined, put the world centuries ahead in the mysteries of the universe and the purposes of God. To the observation of a flower dimly pictured on a stone, we owe the philosophical researches in chemistry and light which ultimately gave us the daguerreotype.

Truth.—How beautiful is truth! In this world, where there is so much falsehood and deceit, whereby hearts are estranged, and recriminations, assaults and crimes engendered—how beautiful are the true thought, word and deed. Like the sun smiling out amid the angry storm—like the bright stars shining through the heavy night cloud—like friend clasping the hand of friend—like right rebutting wrong—like the lance of virtue ringing on the shield of vice—like heaven upon earth, and God in man, is Truth! Precious and Priceless. Dearer than smile of friend, love of parent, or pomp or fame. Truth is all. By this we know the nature and value of things—Falsehood is a craven, a dastard. Truth is bold, noble, and God-given, beyond every other attribute of the soul.—*Hall.*

Literature for the Young.—The question of engaging the attention of the young, in favor of good literature is, every way, a most difficult one—it has, at times, quite a hopeless look about it—at all events, we cannot bring ourselves to deal in the customary common places about it. Every body is ready with a 'What is wanted in this'—and yet, goodness only knows what is wanted. We should be very sorry to see English editors adopt the tricks that are common in America—such as publishing photographs and memoirs of little boys at school who win

prizes, thus puffing the schools and turning a penny in that line, as well as doing something to spoil the poor boys. We are not aware that they have yet got so far as publishing photographs of school-girls; but it is likely enough, for they freely publish the love affairs—most fantastically conducted—of boys and girls of fourteen, and those with illustrations. It must be remembered too, by those who think that the 'education' of the masses will make an immense difference in this matter, that the public addressed by these transatlantic periodicals is better read and more 'respectable' than the public who would take in similar periodicals over here. Yet it is not to be supposed that publishers, who think they see their way to much better things, who have large experience, and who have counted their resources, will stay their hands for any of the dimly discursive considerations suggested by what we have seen.

For myself, I think the food of bad literature could be very materially checked by any competent publisher taking a common sense view of the subject and working it out with the help of strong faith in human nature and in the general progress of society. Some things are clear, and admitted on all hands. Literature for boys and girls, as distinguished from children, must be forward-looking, and full of spirit and enterprise, and quick with the warm blood of youth. It must be full of incident and picture, its *motif* must be will and feeling rather than ideas. It must not be goody goody, and it certainly must not be rudish. Perfectly pure and modest, of course it must be, must it must be gay and fresh. And the spirit of Divine obligation and human service must be everywhere present, though nowhere obtruded. When these conditions are united in literature, for growing boys and girls, and when really high class talent is brought to bear upon the production of such literature, a better state of things will have been begun. Much harm has undoubtedly been done by the diffusion of a false light, but this cannot be undone by excluding the people from all prospect of amelioration in their current literature. Never, never! The people, young as well as old, will be sure to read something; they will read what is offered to them. The incitements to an inappeasable mental restlessness are come into the world. The powers that awaken and foster the spirit of curiosity are to be found in every village; magazines are in every cottage and hovel. The infant's cries are hushed with picture leaves, and the cottager's boy sheds his first bitter tears over pages which go to mould his character for life.

—Contemporary Review.

Synopsis of Rain and Snow fall for 1875.

MC GILL COLLEGE OBSERVATORY.

MONTH.	Inches of rain.		Inches of snow.		No. of days on which rain and snow fell.
	Inches of rain.	No. of days rain.	Inches of snow.	No. of days snow.	
January.....			35.0	19	
February.....	0.42	3	12.9	12	1
March.....	0.80	3	11.6	18	1
April.....	1.18	6	7.3	3	1
May.....	5.13	16			
June.....	3.26	12			
July.....	3.64	14			
August.....	2.59	14			
September.....	5.18	15		1	1
October.....	4.74	20		1	1
November.....	0.50	3	21.7	16	2
December.....	0.68	8	21.2	18	3

Total rainfall during year was 23.12 inches.
 Total snowfall during year was 115.7 inches.
 Total rain and melted snow was 39.69 inches.
 Total number of days on which rain fell, 112.
 Total number of days on which snow fell, 88.
 Total number of days on which rain and snow fell, 12.
 Total number of days on which rain or snow fell, 198.

Meteorological Abstract for the year 1875.

MONTHLY MEANS DERIVED FROM THE HOURLY OBSERVATIONS TAKEN AT M'GILL COLLEGE OBSERVATORY.—HEIGHT ABOVE SEA LEVEL 187 FEET

Month.	THERMOMETER.			Range.	Mean.	BAROMETER.			Range.	Mean.	Mean pressure of vapor.	Mean relative humidity.	WIND.		Sky clouded per cent.	Rain and snow melted.	Month.
	Max.	Min.	Mean.			Max.	Min.	Mean.					General Direction.	Mean velocity in miles per hour.			
January.....	29.5	-13.2	42.7	30.1521	30.636	29.438	1.218	80.9	W	14.7	0.10	80.9	W	57	3.50	January	
February.....	43.4	-21.0	67.4	29.9592	30.601	29.303	1.298	78.5	W	17.1	0.650	78.5	W	56	1.71	February	
March.....	41.0	-10.0	51.3	30.0593	30.491	29.510	0.981	76.5	N	13.3	0.989	76.5	N	57	2.26	March	
April.....	53.70	11.4	49.9	29.9336	30.520	29.348	1.172	66.8	N	12.8	1.130	66.8	N	57	1.91	April	
May.....	82.2	30.0	52.2	29.9043	30.350	29.322	0.998	69.1	N	10.1	2.880	69.1	N	57	5.13	May	
June.....	84.3	39.8	44.6	29.9283	30.291	29.519	0.775	72.0	S	9.5	4.118	72.0	S	58	3.26	June	
July.....	80.2	49.8	30.4	29.9036	30.277	29.618	0.659	75.5	S	11.2	3.123	75.5	S	43	3.64	July	
August.....	87.0	51.0	36.0	29.9967	30.391	29.718	0.676	77.0	W	5.6	5.411	77.0	W	48	2.59	August	
September.....	86.8	31.1	52.7	29.9060	30.400	29.467	0.933	76.0	W	11.7	3.187	76.0	W	61	5.18	September	
October.....	38.0	11.1	31.1	29.9671	30.408	29.404	1.003	80.5	W	11.3	2.108	80.5	W	69	4.74	October	
November.....	41.0	-17.9	58.9	30.0282	30.188	29.365	1.333	80.1	W	13.8	1.189	80.1	W	69	2.67	November	
December.....	51.0	-22.2	76.5	29.9446	30.682	28.932	1.730	83.9	W S	12.2	0.957	83.9	W	74	3.10	December	
Mean.....	62.40	12.92	49.48	29.97832	30.639	29.439	1.0639	76.52		11.94		76.52		58.4	3.307	Mean	

Thermometer readings reduced to sea level and to temperature of 32° Fahrenheit. Pressure of vapor in inch of mercury. Humidity relative saturation being 100. Observed. 10 inches of snow is taken as equal to 1 inch of water. Greatest heat was 82.0, on the 20th of August; greatest cold 21.0, on February 8th, giving a range of temperature for the year of 111.0 degrees. Greatest range of the thermometer in one month was 76.5, in December. Greatest barometer 30.688 on November 2nd and lowest was 28.952, on December 13th; range for year 1.736 inches. Least relative humidity was 34, on the 11th of April. Rain fell on 112 days. Snow fell on 88 days. Rain or snow fell on 122 days. Total fall of rain 23.12 inches. Total fall of snow 115.7 inches. Total precipitation in inches water 39.69 inches.

ABSTRACT FOR THE MONTH OF JANUARY, 1876.

OF THE-HOURLY METEOROLOGICAL OBSERVATIONS TAKEN AT MCGILL COLLEGE OBSERVATORY. HEIGHT ABOVE SEA LEVEL, 187 FEET.

Day.	THERMOMETER.				BAROMETER.				† Mean Pressure of Vapour.	‡ Mean Relative Humidity.	WIND.		SKY CLOUDED IN TENTHS			• Rain and Snow Melted.	Day.
	Mean.	Max.	Min.	Range.	Mean.	‡ Max.	‡ Min.	Range.			General direction	Mean Velocity in m. p. hour.	Mean.	Max.	Min.		
Sunday 1	40.81	54.0	33.5	20.5	30.0659	30.154	29.865	.289	.2196	84.1	N. E.	11.2	8.9	10	5	0.02	1
2		53.3	31.7	21.6							S.	20.0					2 Sunday
3	33.35	37.5	25.0	12.5	29.8937	29.979	29.771	.208	.1305	68.0	W.	19.1	3.9	10	0	0.01	3
4	8.46	25.7	4.5	21.2	30.4384	30.624	30.091	.533	.0444	68.7	N. W.	19.0	0.5	2	0		4
5	6.14	11.0	0.6	10.4	30.2929	30.644	29.935	.709	.0481	93.6	N. E.	9.6	7.8	10	0	0.25	5
6	13.49	17.2	9.0	8.2	30.0860	30.332	29.873	.459	.0697	86.7	N. E.	8.2	10.0	10	10	0.28	6
7	10.16	12.8	5.5	7.3	30.2892	30.354	30.222	.133	.0555	79.9	E.	4.4	9.5	10	6	Inapp.	7
8	17.29	20.2	10.2	10.0	29.9734	30.200	29.665	.535	.0875	91.1	E.	5.6	10.0	10	10	0.23	8
Sunday 9		25.6	19.2	6.4							N. E.	4.7				0.34	9 Sunday
10	24.57	42.2	3.6	38.6	29.4082	29.746	29.141	.602	.1065	71.1	W.	26.2	9.9	10	9	0.46	10
11	2.35	7.8	-5.3	13.1	29.8812	29.928	29.814	.114	.0314	65.1	W.	26.7	2.6	10	0		11
12	0.15	5.5	-3.2	8.7	29.9316	29.082	29.863	.199	.0290	68.7	W.	20.0	0.7	2	0		12
13	-1.90	3.2	-6.5	9.7	30.2550	30.315	30.130	.185	.0290	73.0	W.	18.8	4.5	10	0		13
14	12.12	21.2	-1.1	25.3	30.1402	30.298	30.035	.268	.0680	83.2	S. W.	13.6	8.7	10	0	0.07	14
15	16.04	26.8	9.0	17.8	30.1077	30.246	29.744	.502	.0777	83.2	S. W.	9.0	7.7	10	0	0.20	15
Sunday 16		30.6	17.1	13.5							N.	14.0				0.13	16 Sunday
17	20.76	33.2	12.5	20.7	29.9871	30.150	29.878	.272	.1024	89.5		10.9	10.0	10	10	0.16	17
18	37.15	40.3	32.2	8.1	29.6805	29.897	29.314	.583	.2017	92.0	S.	14.0	10.0	10	10	0.93	18
19	41.90	46.8	36.5	10.3	29.4002	29.481	29.328	.153	.2330	87.0	S. W.	20.5	10.0	10	10	0.19	19
20	25.14	46.6	16.1	30.5	29.7562	30.037	29.356	.671	.1024	73.0	W.	24.6	5.6	10	0		20
21	9.17	19.0	1.4	17.6	30.3477	30.601	30.037	.564	.0488	72.1	N. W.	14.5	4.9	10	0	0.06	21
22	4.09	8.0	-3.4	11.4	30.5974	30.763	30.393	.370	.0369	69.5		8.2	6.0	10	0		22
Sunday 23		19.8	1.8	18.0								13.0				0.55	23 Sunday
24	11.97	17.8	6.2	11.6	30.2095	30.310	30.081	.226	.0511	67.7	N. W.	12.2	6.9	10	0		24
25	8.84	12.1	6.2	5.9	30.0516	30.294	29.773	.521	.0536	82.9	N. E.	6.5	10.0	10	10	0.22	25
26	8.02	14.7	3.0	11.7	30.1281	30.228	29.887	.341	.0459	74.0	W.	13.7	1.0	4	0		26
27	24.05	33.0	4.8	28.2	29.7788	30.028	29.560	.468	.1227	89.1	S. W.	17.0	9.7	10	8	0.15	27
28	31.20	34.6	20.0	6.6	30.0080	30.140	29.731	.409	.1587	90.4	S.	5.6	10.0	10	10	0.20	28
29	31.65	45.8	12.7	33.1	29.5697	30.021	29.388	.633	.1726	78.7	S. W.	29.3	6.9	10	0	0.16	29
Sunday 30		12.0	-4.5	16.5							W.	14.3					30 Sunday
31	20.97	30.9	5.4	25.5	30.2018	30.316	30.101	.242	.0779	66.9	S.	11.7	2.2	6	0		31
Means	17.73	26.10	9.96	16.14	30.0186			.917	.0925	78.43		14.53	6.80				

* Barometer readings reduced to sea-level and temperature of 32° Fahr. † Pressure of vapor in inches mercury. ‡ Humidity relative saturation, 100. Observed. Ten inches of snow is taken as equal to one inch of water.

Mean temperature of month, 17.73. Mean of maxima and minima temperature, 18.03. Greatest heat was 54.0 on the 1st; greatest cold was 6.5 below zero on the 13th,—giving a range of temperature for the month of 60.5 degrees. Greatest range of the thermometer in one day was 38.6, on the 10th; least range was 6.4 degrees on the 9th. Mean range for the month was 16.14 degrees. Mean height of the barometer for was 30.0186. Highest reading was 30.763 on the 22nd. Mean elastic force of vapor in the atmosphere was equal to .0935 inches of mercury. Mean relative humidity, 78.1. Maximum relative humidity was 100 on the 19th. Minimum relative humidity was 48 on the 11th. Mean velocity of the wind was 11.5 miles per hour. Greatest mileage in one hour was 46 on the 20th. Greatest velocity was 50 m. p. h. on the 9th. Mean direction of the wind, West. Mean of sky clouded was 68 per cent. Rain fell on 7 days. Snow fell on 16 days. Rain or snow fell on 20 days. Rainfall, 1.87 inches. Snow fall 27.4 inches. Total precipitation in inches of water was 4.61.