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THE JOURNAL OF EDUCATION AND AGRICULTURE,



PROVINCIAL NORMAL, AND MODEL SCHOOLS, TRURO, N. S.

FOR THE PROVINCE OF NOVA SCOTIA.

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EDUCATIONAL.

I.—THEORY OF EDUCATION.

PHYSICAL EDUCATION OF ORGANS—THE BONES OR THE SUPPORTING SYSTEM—GRADING OF SEATS AND DESKS.

We have now discussed at length the principles involved in the ventilation and temperature of school-houses, grounding all upon the nutritive or assimilative system of organs,—the organs of digestion, circulation and respiration. We proceed in this article to the consideration of the second proposition.

II. *That it is the duty of all interested in the education of the young to use every means for the purpose of imparting size, solidity and strength to the bones.*

Every department in the kingdom of nature has its appropriate support. The soil derives its adhesiveness and tenacity from the alumina it contains. The stalks of plants are mainly supported by silicious matter. The supporting system of organs in the animal is the bones.

The bones of the human body amount to about 260. This large number is evidently owing to the incalculable variety of movements required from man, and they are all so admirably connected by articulations that they admit of precisely that kind of motion which the animal requires from it, and of no other.

The advantages of this arrangement are not less obvious than admirable. Had the osseous framework consisted of one entire piece, not only would men and animals have been incapable of motion, but every external shock would have been communicated immediately to the whole system. Whereas by the division of its parts, and by the interposition of elastic cartilages and ligaments at the joints, free and extensive motion is secured, and the impetus of every external shock is deadened in its force and diffused over the body, in the same way as, to a person riding in a carriage, the jolt of the wheel, passing over a stone, is diminished by being equally diffused over the whole vehicle in consequence of the elasticity of the springs.

Bones consist of two kinds of substances, viz., those of an animal and those of an earthy nature, the former imparting life and growth, and the latter solidity and strength. The proportions of these animal and earthy substances vary at different ages. In childhood and youth the animal preponderate, and, in more mature years, the earthy. And, hence, in early life the bones are less heavy, more pliable and elastic, and possessed of greater vitality, and in old age their sensibility is diminished and a lower degree of life exists. And hence, too, it is that bones broken in youth reunite in one third of the time necessary for their reunion in advanced life.

And what is the great and important practical lesson taught parents and teachers by this diversity of composition in the bones? If the bones in the young are in consequence of the

preponderance of animal matter more elastic and flexible, than it is clear that every means ought to be employed for the purpose of preventing their contortion and curvature. Exercise here as in every other part of our physical frame, is indispensably necessary, to give size and strength to the bones, to deposit those very substances of which they are mainly composed. By a law of our constitution, to which we have already referred when any part of the system is active, it attracts to itself by the simple stimulus of that activity an increased supply of blood and nervous energy. The former repairs the waste of substance which action produces, and the latter gives an increased tone in harmony with the greater call made on its powers. If the exercise is momentary and not repeated, the extraordinary flow of blood soon disappears, and the nervous power falls to the usual standard. But if it is continued for a time, and is recurred to at regular intervals, a more active nutrition is established; a permanently greater supply of blood enters the vessels even during the intervals of inaction; and an increase of development takes place, attended with increased facility and vigour of function. This law of exercise as influencing nutrition and function is universal in its application, and applies to the osseous as much as to any other system. If the bones are duly exercised, their active nutrition goes on, and they acquire increased dimensions, strength and solidity. If they are not exercised, the stimulus required for the supply of food to them becomes insufficient; imperfect nutrition takes place, and debility, softness and unfitnes for duty follow in the train.

But whilst exercise is thus indispensably necessary to impart solidity and strength to the bones, it behoves to be wisely and judiciously adapted to their condition at the different periods of life. How many parents, for example, disregarding the fact that the bones are comparatively soft and pliable in infancy,—and in their haste to see the little objects walk without support,—are continually soliciting attempts at standing or walking, long before the bones have acquired sufficient power of resistance, and the muscles sufficient power of contraction, to cope with this law of gravitation. The natural consequence is a curvature of the bone, which yields just like an elastic stick bending under a weight. The two ends approach nearer each other than they ought to do; and the muscles, to accommodate themselves to the change, become shorter on one side, and perhaps longer on the other each losing part of its efficiency in the unnatural change which it undergoes. But, even after the young are capable of sustaining some pressure, every means should be used and every pains taken to preserve the straightness of the bones of the young. For this purpose they should be made to stand and sit and walk in an erect position. This will enable the vertebral column to accomplish the high and important ends for which its whole construction was evidently intended, and will preserve the bones of the upper and lower extremities in a vigorous and healthful condition.

And now it may be asked, What is the provision required for securing all these objects, in so far as the furniture, seats, desks, &c., of the school-room are concerned? In reply to this question we would say, first of all, that the seats must be nicely proportioned to the age and size of the scholars, that is, they must be thoroughly graded. In a miscellaneous school the height of the seats, so as to allow each child to rest his foot firmly upon the floor, should range from seven to fourteen inches. If this is not attended to, if the seats are so high that the feet of the children cannot reach the floor, not only will they be uncomfortable and restless, but their thigh-bones, from the weight

bearing upon them, will be in danger of becoming curved. But not only should the feet of the children rest gently upon the floor, their backs should be also well supported. For this end the seats should be furnished with properly constructed backs, and of such a height as will afford a pleasant and agreeable support to the small of the back, or the lumbar region, as it is called. If these things are not provided for, if the seats are too high, and the back, besides, unsupported, the most disastrous consequences may ensue. The children will naturally stoop forward in order to balance themselves; and thus the shoulders will become rounded, their chests contracted, their constitutions enfeebled, and not unfrequently the seeds of pulmonary disease deposited.

Every care should also be employed in the construction of the desks, that is, they should be made exactly to correspond with the height of the seats. If they are too low, a stooping posture will be induced. If they are too high the effect will be, the elevation of one shoulder and the depression of the other; and thus a permanent curvature of the vertebral column will be produced. To avoid these evils the desks must be so constructed as that both the arms shall be kept on the same level and rest equally on the table; and their height such as that they shall strike half-way between the elbow and the arm-pit as the arm hangs by the side.

"The secret of posture," says Mahow, "consists in avoiding all bad positions, and in not continuing any one position too long. The ordinary carriage of the body is an object worthy of the attention of every parent and instructor. The more favourable impression which a man of erect and commanding attitude is sure to make, is not to be overlooked. But there is a greater good than this, for he who *walks erect* enjoys better health, possesses increased powers of usefulness, realizes more that *he is a man*, and has more to call forth gratitude to a beneficent Creator, than he who attempts an *oblique* posture."

INTELLECTUAL EDUCATION.

THE notion that too generally prevails regarding Intellectual Education is, that it consists merely in making the subject, that may happen to be brought under the notice of the young, plain and palpable—thoroughly understood; and, for this purpose, the words in which that subject is presented are analyzed and defined, the clauses or sentences dissected and minutely explained. Now, whilst all this is exceedingly proper, and whilst no one can fail to perceive the vast superiority of this to the old routine mechanical process, which required the mandating of so many words and sentences without the most distant apprehension of their import, still it is nought but instruction after all, and falls far short of real intellectual education. Intellectual education includes instruction, and that conveyed in the most simple and intelligible manner, but it is something far above and beyond, something vastly more lofty and ennobling. It is neither more nor less than the communication of the best instruction or knowledge, in such a way as that all the faculties of the intellect shall be exercised, and thereby drawn out, developed, strengthened. And how is this to be effected? In two ways, first, by presenting the appropriate, congenial food to each faculty, and, secondly, by so administering it that it shall be digested;—or, to speak without a figure, by bringing such subjects before the mind as are best fitted for the employment of its various powers, and by bringing them in such a way as that these several powers shall be actually exercised. As to the first

of these points there is little or no difficulty. The food most congenial to the perceptive faculty is just the object most gratifying to each sense,—to consciousness, the controlling of the will, or the doing habitually what we resolve to do, whether in the acquisition of lessons or the mastering of any subject,—to original suggestion, the exercising of patient thought on any given subject, the incouraging of a spirit of earnest and persevering inquiry,—to abstraction, the distinguishing and separating from each other things which differ, the studying of the generalizations and combinations of nature,—to memory, thoroughness in whatever is committed,—to reasoning, the making of arguments for ourselves on all matters of investigation that come under our notice,—to imagination, the forming of pictures, and the associating of the visible with the invisible, the natural with the spiritual. All this, we have said, is comparatively easy. The actual digestion of the food, on the part of the scholars, constitutes the grand difficulty. This, again, involves the consideration of two things,—the theory and the practice, or the philosophical principle and the means of carrying it out.—Let us meditate for a little on each of these topics. And, first, as to the theory or the philosophical principle involved. This consists in the teacher's adapting himself to the sensible nature of his scholars, by borrowing images, or illustrations, or pictorial representations of the fact, or truth, or principle intended to be communicated, from objects, or things, or pursuits with which they are perfectly familiar, and thus conducting them from the known to the unknown, *du connu a l'inconnu*.—That man is a sensible being, very much under the influence of his senses, of external objects or pursuits, requires no proof.—Is not all language a verification of this fact? What is every word but the representation of an object, or a combination of objects, existing in certain conditions or relations. And thus every word, even the most insignificant, can be pictured out.—Again, do we not see every day this principle instinctively acted on. Look, for example, at the conduct of the mother in her attempts to impress the mind of her prattling child on her knee with any event, or fact, or truth. Is it the unnatural deed of Cain, imbruing his hands in the blood of his unoffending brother? She has no sooner determined to depict this transaction to her little one than she hies away to the library shelves for the folio copy of the Bible, and at once turns up the pictorial representation of this event. Having fixed the eye of her child upon the picture, she proceeds to the rehearsal of the tragical story. And why does she resort to this method? Is it because she is aware of the philosophical principle involved? No.—She does it from pure instinct. And could there be a nobler testimony to the truth of our position? But we would conduct our readers to a still higher platform in support of our view.—And we would bid them contemplate the method adopted by the Divine Being in making known his will to mortals. No one, we think, can read the sacred record without being struck with the profusion, the appropriateness and the gorgeousness of its imagery, that there is scarcely a spiritual truth or doctrine or moral precept unfolded, without its being embodied in some biographical sketch, or exhibited in some natural emblem or some parabolic illustration. It matters not whether man is in an un-fallen or fallen condition, whether he is living under the dawning twilight or the noontide radiance of the remedial economy, the same mode of revelation is followed. Witness, for example, the two special trees in the Garden of Eden—the tree of the knowledge of good and evil and the tree of life. Witness, again, the immense ceremonial of the preparatory dispensation, how

completely everything connected with the person, the character, the office and the work of the cunning deliverer of the human family, was portrayed by personal types, by symbolic rites, and sacrificial observances. And why all this? It was because the Church was then in her minority, in a state of pupilage, and required all the more that her instructions should be couched under natural emblems. But the finest illustration of this mode of teaching, anywhere to be found is in the discourses and interviews of the incarnate Son of God, the most profound Philosopher the world ever saw, for in Him were hid all the treasures of wisdom and knowledge." No one, we think, can peruse the evangelic story without being struck with the admirable dexterity of the Great Teacher in the wielding of this weapon, the conveying of spiritual and moral lessons through the medium of natural objects, of parabolic illustrations, and of analogical reasonings. With what inimitable ease he lays a tribute upon the world of nature around to meet and rebut, at the instant, the captious cavils of his accusers, and not only so, but to shut them up, by a process of reasoning, to certain convictions and conclusions which they could neither guiney nor controvert. "Is it lawful to give tribute to Caesar?" said the Pharisees: "Show me a penny," said our Saviour—"and they brought it, and he said unto them, Whose is this imago and superscription? And they said unto him, Caesar's. And Jesus answering said unto them, Render to Caesar the things that are Caesar's, and to God the things that are God's. And they marvelled at him." "Who is my neighbour?" said the same party. Jesus Christ did not say in reply that all the human family were the lawyer's neighbour, or enter upon an abstract elaborate disquisition of the great moral lesson he came to exemplify and establish: that we are all our brothers' keepers; but he answered it, by picturing out to him the touching and the thrilling story of the good Samaritan. Again, on another occasion, the Pharisees watched him whether he would cure on the Sabbath-day; our Saviour looked upon them and asked, "Is it lawful to do good on the Sabbath-day or to do evil; to save life or to kill?" but they held their peace. He did not tell the Pharisees whether it was or was not lawful to do good on the Sabbath-day: he appealed to their consciences; he trained them; they felt the rebuke; "they held their peace." Take another example, which we simply recite; it cannot be touched without marring its effect: "And one of the Pharisees desired Jesus that he would eat with him. And he went into the Pharisee's house and sat down to meat. And, behold, a woman in the city, which was a sinner, when she knew that Jesus sat at meat in the Pharisee's house, brought an alabaster box of ointment, and stood at his feet behind him weeping, and began to wash his feet with tears, and did wipe them with the hairs of her head, and kissed his feet, and anointed them with the ointment. Now, when the Pharisee which had bidden him saw it, he spake within himself, saying, This man, if he were a prophet, would have known who and what sort of woman this is that toucheth him: for she is a sinner. And Jesus answering said unto him, Simon, I have somewhat to say unto thee. And he saith, Master, say on. There was a certain creditor which had two debtors: the one owed five hundred pence and the other fifty. And when they had nothing to pay, he frankly forgave them both. Tell me, therefore, which of them will love him most? Simon answered and said, I suppose that he to whom he forgave most. And he said unto him, Thou hast rightly judged." Then all was clear for making the application; indeed Simon himself, however reluctantly, was compelled to draw

the lesson. As the debtor who had been forgiven most loved most, so this woman loved much because she had been forgiven much. One other case, and that mainly for the purpose of showing how, by this mode of teaching, the Great Teacher enlists the intellectual powers, nay, insists on their legitimate exercise. The case to which we refer is the mission of John's two disciples to Christ, for the purpose of finding out whether he were the Messiah. These two disciples, being introduced, asked, "Art thou he that should come, or do we look for another?" Jesus answered and said unto them, Go and show John again those things which ye do hear and see. The blind receive their sight, and the lame walk, the lepers are cleansed, and the deaf hear, the dead are raised up, and the poor have the gospel preached unto them. And blessed is he, whosoever shall not be offended in me." As if He had said, "Go home and tell your master what things you have seen; then, taking up the Scriptures in your possession, compare the predictions relative to the Messiah with what you have seen and draw your own conclusions." But why need we multiply these cases, as illustrative of the Saviour's mode of teaching, the whole Evangelical Record is but one unbroken continuation of such cases, rising, one above the other, in beautiful simplicity, and in striking appropriateness to the experience and occupations of those He addressed. And could there be a stronger possible corroboration of the soundness of our view? Who knows the latent springs of human action better than He who fashioned the human heart? And, surely, when we find Him who spake as never man spake, "who needed not that any should testify of man, for He knew what was in man"—when we find Him uniformly employing this mode of teaching, conveying spiritual truth, moral precepts through those natural objects or visible things with which his auditors were perfectly familiar, we are surely warranted to conclude that this is the best, the surest way of at once enlightening the understanding and of enlarging the heart; and to make Him the model and the pattern of our imitation in this as in every other respect. And what is the real province of the sabbath-school and week-day teacher in reference to the emblems and parabolic illustrations of Scripture? It is to hold up the picture to the mind's eye of their scholars and to allow them to deduce the lesson or truth intended,—to present such a pictorial delineation of the act that they shall be able themselves to infer the *so*. But this example should influence and direct the educators of the young, not only in religious and moral, but in secular, or literary and scientific subjects. Indeed, the principle is every whit as applicable and as forcible to the latter as it is to the former class of subjects; and, not to reduce it to practice here, is not only perversely to hold on in the old beaten track, but it is in broad daylight to denude ourselves of the only instrumentality by which we can secure the actual exercise of the minds of the young, and by which alone their thinking and reflecting faculties can be drawn out, developed and strengthened. But this principle has been reduced to practice. Pestalozzi, the great Swiss educationist, was the first who fairly and vigorously and perseveringly worked it out, and imparted system and form to it in popular education. But this principle, in all his plans and methods, wanted its only solid basis—the Bible, and, still more, his objective system was defective in that it merely furnished a pictorial representation of the external phenomena or outward habits of the things signified. It was reserved to David Stow, a young merchant in the city of Glasgow, upwards of forty years ago, to be the honoured instrument of placing this principle on its only enduring ba-

sis, and of adding to the systematic use of objects and prints in popular education, the systematic picturing out in words of every abstract term, figurative word and figurative phrase, by analogy, and familiar illustrations, grounding all upon the fact that every word in any language either represents an object or a combination of objects, and, therefore, may be pictured out and simplified in words representing such.

So much for the theory of the principle involved. How, it may now be asked, is it reduced to practice—what is the process by which, in the use of any pictorial illustration, we are actually to exercise the faculties of the scholars, we are to train and not merely to teach? It is the process of questions and ellipses, and this process carried on simultaneously with the whole class. This process is thus described by David Stow himself:

QUESTIONS.

What questioning is, every one knows. A question is an examination: it puts the pupil on the defensive—he is placed on his trial—he knows or he does not know what he is asked. If he knows, he ought to give a direct answer in words which he understands; or he may have merely committed the words of the answer to memory, and therefore repeats the sounds. Whichever way it may be, still the boy is put on the defensive, in regard to his memory of ideas or of words. Questioning is simply developing or leading out. It is training only, when the children's ideas are not merely *led out* by questioning, but *led on* by ellipses and questions combined.

For example, a sentence may be worked out in the following manner, and filled up elliptically by the pupils:—

If the master has been speaking of the weather, or prospects of the weather, and says—The sky threatens . . . (the pupils filling in *rain*)* the trainer may invert the sentence thus—It threatens rain to-day, from . . . *the appearance of the sky*. From this answer, or rather from filling in the ellipsis, the children prove that they know *why*. Or the master, with older scholars, may express himself thus—The aspect of the sky . . . *indicates the approach of rain*—the children filling up the ellipsis according to their more advanced style of expression. Before getting this last answer, however, or the ellipsis filled up, the master, after saying—The aspect of the sky . . . and no immediate answer given, may require, as he may choose, for the sake of expedition, to put the direct question—What does the aspect of the sky indicate? Of course, much older scholars will answer—the *approach of rain*. Had they filled in the ellipsis, however, without the question, it is evident they would have exhibited more knowledge of language, and a higher exercise of mind.

If no cross-examination takes place, the master is left ignorant as to whether his scholars really know what is expressed—so far they are not of *necessity* trained. Under this system therefore mere questioning is found insufficient for the full development of the intellectual powers. There must uniformly, be an analysis, based on *simple and familiar illustrations*, and conducted by questions and ellipses mixed, which must be within the extent of the knowledge and experience of the children present. It is highly important and necessary not merely to put questions and ellipses, but during the progress of a lesson frequently to invert the sentences, and thus pulverise the mind by exercise.

ELLIPTSES.

Ellipses on the mode adopted are to a certain extent another way of questioning, also a helping forward of the children in the process of investigation. An ellipsis awakens the attention. The old mode of forming an ellipsis, whenever by chance it happened to be practised, was absurd. It was a mere guess, and scarcely any exercise of mind whatever. An ellipsis ought never to be a guess, but an exercise of idea or thought on the part of the scholars, and expressed by them on a point they already know, or which they have been at the moment trained to. The only published example of an ellipsis with which we are ac-

* The dots point out the ellipses, which are to be filled in by the children.

quainted is as follows.—God made the sky, that looks so . . . God made the grass so . . . God made the little birds to . . . In pretty colors . . . Not having exercised the minds of the children previously, as to the colour of the sky, etc., in the first line, the pupils might answer or fill up what they chose, either 'blue,' which was the answer required—or cloudy or red—and so on through the lines—such being merely a variety of guesses without any training. So it is in telling a narrative or story on the 'elliptical system,' as it is termed. For example, 'This morning I left my house, and when walking on the street, I saw a . . . ' Of course, any answer or filling up here must be a mere conjecture. I may have seen a thousand things, but had the master been conducting a training lesson upon any particular subject, the filling in of the ellipsis by the pupils would have been an answer on that point. Questions and ellipses, therefore, ought *uniformly to be mixed*—sometimes only one question, and then one or two ellipses, or sometimes two or three questions or ellipses consecutively, varied, however, according to the age and amount of knowledge developed by the pupils.*

An ellipsis being the filling up of a point which the children already know, or which the master may have brought out in the lesson in hand, and which he requires to be expressed in words, ought to be filled in, not merely by a single word, at the termination of a line or sentence, but, in the case of more advanced scholars, it may be many words, *always including*, however, the *idea or point* to which the mind has already been trained. It therefore at once assists the mental composition of the child—leads him to the point without telling,† and in fact is a *little question* assisting him to walk, by taking him by the hand, as it were, without carrying him, *which telling or mere explanation would be*. It places the child also less on the defensive than in mere questioning, and so fills up those *interstices*, and that variety of light and shade, which, in 'picturing out,' are so necessary to the full understanding of a subject. By the master *inserting the sentence*, and leaving out other words than he did at the first ellipsis—but which involves the idea or proper understanding of the point—these being properly filled in by the pupils, he secures that *there must be a clear and vivid understanding* on the part of the scholars.

As we cannot stop here to present illustrations, we would simply state, that questions and ellipses, *properly mixed* in the process of intellectual training, are preferable to mere question and answer, however varied; or pure ellipses, however well arranged. Students when they first enter the Seminary uniformly confine themselves to putting questions—the proper mode of putting ellipses combined with questions is a high attainment in practical training. The union affords the most pleasing, the most natural, and the most efficient of all methods of cultivating the understanding. We may add, that with young children, unaccustomed to express their ideas in words, ellipses must be more frequently resorted to, and questions more frequently as they proceed in their course; but, however advanced in years or attainments, the use of ellipses, in conjunction with questions, will be found the most efficient method.

There is no difficulty in putting questions, and none in forming ellipses; that is to say, in conducting a lesson upon the simple catechetical, or the simple elliptical methods; but there is a considerable difficulty in uniting the two principles in a natural manner, so as to form *simultaneous training*, and without this union there cannot be *picturing out*. To the drawing of a proper picture, there is required not merely direct or straight lines, like questions and answers, but the filling up of innumerable interstices, which the mere questions leave unsupplied. A question may prove the amount of knowledge, but does not supply knowledge to a child. Ellipses properly introduced supply as well as draw out knowledge. The mode of reasoning Socrates adopted in instructing his *disciples*, by which, availing himself of

their previous knowledge, he led them from admitted premises to a natural conclusion, may do with men who are furnished with a large amount of facts, but will not do with children, whose stock is soon exhausted. The ellipses partially suggest the requisite facts, and the questions stir up what the children already know. The union of the two supplies materials, during the natural process, and produces an easy and natural flow of intellectual development and culture, and may be stated as the 'inductive philosophy' applied to the *training* of children.

SIMULTANEOUS ANSWERS.

The sympathy consequent on simultaneous answers given by children to direct questions or the filling up of suitable ellipses during the process of examination, and in conducting a new or additional point of the lesson, forms a fundamental principle of the Training System in its Intellectual Department. A direct question is simply an examination of the child's extent of knowledge—ellipses, properly made, require him to fill in the interstices. Questions are like the direct lines of a portrait—ellipses alone fill in those various shades by which a true and natural picture can be drawn. This sympathy in question, by the combination of questions and ellipses, is best accomplished by requiring simultaneous answers. To enter into particulars:

The gallery, or slight of ascending seats, affords the best opportunity for hearing simultaneous answers from a large class of children; and so important is the introduction of this principle into popular schools, on the method of questions and ellipses mixed, that the Training System by many has been termed *the simultaneous system*.

Before noticing a few points of this part of our subject, we may state, that whilst in general, simultaneous answers are required, they are mingled with questions to individuals, both for the sake of variety, particular examination, and for checking inattention in any of the children.

The great object in the Intellectual Department is, to present food for every variety of mind—suited to every capacity, without overstraining any, and to cultivate by exercise, during each day, every varied power of human nature. We thus have the daily exercise of the individual powers and faculties, and the combined simultaneous exercise and sympathy of all present, which is best secured by simultaneous answers. The simultaneous gallery method, as we have already said, gives the requisite time for moral superintendence and subsequent review of conduct.

All cannot acquire the same amount of knowledge of any kind—and each mind varies in the capacity and qualities of its powers. Some are more imaginative—others illustrative—others more logical—some have a larger capacity for facts, whether dates, terms, or numbers, and some also for music—some have greater powers of observation—others of reflection and judgment—and others of abstract thought. It cannot be supposed, therefore, that all will be equally ready in answering every question, or in filling in every ellipsis. The matter-of-fact boys in the gallery will, therefore, simultaneously answer any question about words or dates, more quickly than those of imaginative or logical powers; while the imaginative will more readily grasp the *idea*, and the logical the *reason*. These are matters of daily and uniform experience, during a training lesson, and therefore, we say, it would be unreasonable to expect, that sixty or eighty scholars can answer *simultaneously* any question put by the master, at any one moment. But the questions are varied, and subjects of a religious, scientific, elementary, moral, and practical kind, are so frequently brought by the trainer before the pupils, that every variety of mind receives its daily cultivation, and, as already stated, food is presented suited to the taste and capacity of all, and along with the usual physical exercises, by which attention is secured, each admits into his mind as much knowledge as his natural powers are capable of receiving; none are surfeited, and none are starved. We are quite aware, however, that the working of this principle, like that of any other art, is only fully understood by those who practise it.

When the system is properly conducted, the whole pupils receive the information that any one knows by the master throwing back upon the gallery the proper answer, whether it may

* Of late, some teachers finding the proper mode of forming ellipses difficult of attainment, express the first syllable of the word, such as this—'The works of man are all in . . . and immediately the children add *perfect* others *fill* the entire word, which, of course, the pupils will readily express.

† So that to find out what is wanting becomes an exercise of the understanding, and of course keeps up the attention as the lesson proceeds.

have been to a direct question or from an ellipsis, and also requiring a simultaneous response, not by mere repetition, but frequently by *inserting the sentence.*

MENTAL ARITHMETIC INTRODUCTORY REMARKS.

By Mental Arithmetic is usually understood the art of number carried on in a purely mental form, without the aid of slate, or pencil, or pen. This species of Arithmetic has, undoubtedly, in all civilized communities, preceded the use of the slate or written form. Even in a more advanced state of society individuals have now and again arisen who have evinced extraordinary powers in mental calculation, and who have frequently been exhibited as among the living prodigies of the age in which they lived. And others again, from some contingency in their more juvenile years, have been able to carry on their business transactions with the greatest expedition and accuracy without the assistance of pen or pencil. Of course, in all these and similar cases, the mental processes of calculation have been very diverse, depending on some accidental occurrence,—that is, they have arrived at the same conclusions without any fixed laws or principles to guide them. It is only within the last thirty or forty years that Mental Arithmetic has been reduced to a system, and introduced into schools as one of the common branches of education. The great pioneer in this department, in Great Britain, was the celebrated John Wood, of the Sessional School, Edinburgh. This, along with the etymology of the words of the English Language, constituted the linging points by which this gentleman effected a great revolution in the whole condition of the common school education of Scotland. And since his day, Mental Arithmetic, as a branch of education, has been making very rapid strides, and to a greater or less extent is now practised in almost all civilized and enlightened countries. The Prussians and Americans are perhaps the most advanced of all nations in this department. And the effects of this attainment are apparent in both cases in all their commercial transactions. Would that the time had arrived when this shall be considered an essential branch of education in all the common and more advanced schools of this and of every other country! Its importance in a practical point of view can scarcely be overrated. It is not the merchant merely, or the man who has professedly more to do than his fellows with figures, that would be benefitted. From the common day labourer up to the highest professional man—all would derive egregious advantage from its attainment. There is not a day that passes over the head of male or female, of every grade or rank in life, that they have not something to do with figures, and what an advantage is it in such cases to be able at once to cast up their accounts without being required to resort to the Ready Reckoner or to the slate and pencil! But the use of Mental Arithmetic is not the chief benefit to be derived from it. It is the mental discipline, the power of abstraction, the habit of attention and of reasoning which it develops, that constitute its chief value. There is not perhaps one branch of education that involves the exercise of a greater number of the faculties of the intellect than Mental Arithmetic. The faculty it taxes and strengthens most largely is that of abstraction. And who that knows any thing of the dignity and glory of this faculty, as the one by which the grand process of gene-

ralization is carried on, that power of the mind which brings into direct and immediate contact with Him who is the God of all order and system, can fail to hail every means calculated to further its cultivation and improvement, and to appreciate that branch of learning whose direct tendency is to effectuate this end. And what employment better fitted to exercise the faculty of attention? If the question proposed ought, in no case, to be repeated or read more than once, it is easy to perceive how great will be the fixedness of attention that will be given.—Observe the master as he prescribes an exercise in Mental Arithmetic.—and do you not see how steadfastly every eye is directed towards him, as if it were for the averting of a fatal dagger from his breast,—how completely every individual is hanging upon his lips. And will not every exercise thus gone through but whet and strengthen the power of attention, and who does not see that this will affect every object and subject afterwards submitted to the intellect? And who does not perceive that unless this faculty is in vigorous exercise, all the others will prove comparatively unavailing? And, again, need we refer to the advantage to the reasoning power from Mental Arithmetic? Every step or stage in the working out of the prescribed exercise makes but another demand on the ratiocinative faculty; so much so that it may be fairly and legitimately concluded that an individual, who can go through, mentally, long, and winding, and elaborate accounts, is thoroughly competent to direct all the energies of this faculty to any given subject. Any yet, again, need we speak of the benefit of this exercise to the improvement of the memory. The highest and most difficult effort of this faculty is when the object or thing to be remembered is invisible. It is then that memory soars into its purest and loftiest region, and plucks those apples of gold which are as luscious to the taste as they are perennial in their duration. But we need not descant on this theme. However great and manifold may be the practical benefits, they are never for one moment to be compared with the training of the mind, with the disciplining of all the intellectual faculties, which this Arithmetic secures.

And now, it may be asked, when is the proper time for beginning this branch of education? We answer, the very first day the child enters within the walls of a school-room. Children generally can count ten or a dozen as soon as they are capable of distinct articulation. Besides, some children have a far greater gift for number than they have for visible observation, and the sooner they are supplied with the materials for its employment, the more likely is it to be fostered and strengthened.—And if Mental Arithmetic ought to be begun thus early, it ought to be continued as long as possible without the aid of slate or written arithmetic. Indeed, but for the imperfection of the human intellect, there would be no necessity for calling in the assistance of the slate at all. And as the same amount of mental effort is not required with the slate, the instant it is employed will there be induced a sluggishness or a comparative lacking of energy and vigour in Mental Arithmetic; that, in one word, the one is, to a certain extent, antagonistic to the other. And it is on this ground that we urge the necessity of delay in the use of the slate.—When, however, it is introduced, they should both be carried on contemporaneously. Whatever may be the proficiency arrived at in Mental Arithmetic, it should never be abandoned—nay, the time once devoted to it should never be curtailed. It is because of their continuance of the exercise even when the scholars have reached the highest attainments in

Algebra and Geometry, that the Prussians and Germans are so signalized in this branch of learning, and render it such an instrument of power in all their traffic in after-life.

And what, it may be asked, is the best way of beginning with such young children, children that do not even know the alphabet. The true, and indeed the only way, at this early stage, is, by the use of objects. It matters not what these objects are, whether they are stones picked up from the gravel before the school door, or the articles of furniture in the school-room, provided they are actual substances. The enumeration of these, along with addition or subtraction, constitutes the first step. The next is the numeral frame with the beads. The third is the use of objects with which the scholars are familiar, but not presented to the eye, whether they be in integral or fractional numbers. After being thoroughly familiar with all these stages consecutively, in their application to addition and subtraction, they may now be introduced to the study of abstract numbers. But we shall resume the subject in our next, as we intend to present a complete course on this important and interesting branch of knowledge.

II.—PRACTICE OF EDUCATION.

HINTS ON PHYSICAL TRAINING.

FROM STOW'S TRAINING SYSTEM.

1. Physical exercises are the primary points to attend to in the process of training, and may be used as an end, or as a means to an end. You ought to use them in both views, but chiefly in the latter, viz., to secure the attention, and to find access to the mind in the exercise of the intellectual and moral faculties.

2. Be exceedingly careful of your children's health and physical habits in both the covered and uncovered school-rooms. A stronger sympathy exists between the intellectual, the moral, and the physical powers than is generally imagined.

3. *The great secret of securing the attention of children, and thereby training their mental and moral powers, lies in a proper and continued variety of physical or bodily exercises. Remember that children cannot sit still long in one position.*

4. *Let physical exercises not only precede, but accompany, every mental exercise, otherwise you cannot secure proper attention.*

5. *Unless you arrest and keep the eyes of all the children in the gallery upon yourself, you have no security that all are learning. If you do this, the simultaneous answers of the few, purified by the master as a sifter, will be heard by all, and all will learn.*

6. On their first admission to school, the children must have a larger amount, and greater variety, of physical exercises than afterwards, just as the drill-sergeant exercises raw recruits. In other words, the younger the children are, the more physical exercises do they require to keep up the attention. If you mistake as to quantity, at all times let it be by giving too many rather than by giving too few.

7. Never commence a lesson till you have drilled your troops in the gallery, and obtained perfect silence, and the attention and eye of every child present.

8. If the hand is not properly employed in school, it is certain to be employed in mischief.

9. A clap of the hands, and a short laugh, are like letting off the *steam puffs* of the boiler, which prevents those explosions so common at the dismissal of school.

10. If you find any difficulty in getting the children to repeat a hymn distinctly and without a drawing tone, cause them to

repeat by turns the hymn, word by word, and then line by line, and they will soon acquire the tone and manner you wish, provided also that you yourself set the example of articulating every syllable slowly and distinctly.

11. Articulate yourself, and cause the children to articulate every syllable *distinctly*, and every word separately, and the unavoidable accompanying stiffness will soon wear off, and leave a clear and effective enunciation.

12. Speak yourself, and cause the children to speak, in a soft and sometimes under-tone in school, and allow them occasionally to extend their voice and their lungs to a fuller scope in the play-ground.

13. Never speak through your teeth—spread or open your mouth well in speaking, articulate every syllable *distinctly*, and every word *separately*, but of course emphatically, and cause the children to do the same. The exercise will supply the lips, and assist you in enunciation. Remember to exercise yourself daily for three or four minutes at home, in repeating such words as the following.—Re-ce-pi tu-la-tion, re-ce-pi-tu-lation, em-pla-ti-cally em-pla-ti-cally, in-com-pre-hen-si-bi-lity, etc., every syllable being fully and clearly enunciated.

14. Enunciation is a much more important part of training than is usually imagined. Clear enunciation is a *sine qua non* in a school-trainer. It is certainly one-half of the power of a public speaker.

15. Be sure you keep the play-ground, flower-borders, and out-door conveniences, neat, clean, and in the utmost order.

16. Train to cleanliness by causing all habitually to be cleanly.

17. Let the movements to and from the play-ground generally be accompanied by vocal music—some cheerful animating rhyme or other. If of a direct moral tendency, so much the better.

18. By way of favour, allow a portion of the children, by turns to weed or rake the ground, or pick up the stones. The more perfectly *a la militaire* you give the command, yet in a firm, soft tone of voice, the better.

19. A large, empty, or unfurnished hall may be made a play-ground when better cannot be had; but health and liberty require that there be the open, fresh-air'd, and uncovered school-room.

20. See that the gallery be kept clean, the large room and class-room well swept and frequently washed and aired, for the comfort and health of the children.

21. Stand at least seven feet from the gallery—pace along very little—let your position in general be with your left foot rather behind—your head perpendicular, so as to move it easily from side to side, to secure the eye of the children, the rest of your body forming an *obtuse* angle, quite *a la Francaise*.

22. Train your scholars to keep their eyes shut during prayer, and they will require the habit of doing so in church.

23. Train the child to hold his book properly, not with the thumb in the middle, for that will . . . *dirty the leaves*. Why? etc.

24. Check the slightest approach to rudeness or indecency. Permit no one to call nicknames.

25. Cause the whole children, by following you occasionally in single file, to form curved, and various other lines in the centre of the school-room or play-ground. The exercise tends to order and obedience.

TEACHING OF THE ALPHABET.

WE introduced this subject to the notice of our readers in the last number. We pointed out its vast importance as constituting the foundation not only of English reading, but of the whole educational career of the young. We gave our decided preference to the teaching of the sounds or powers of the letters first, rather than the names, and this because it is in accordance with our general system, treating the children from the very commencement of their education as thinking, re-

flecting beings, and not as parrots or machines. We proceed now to detail the order of procedure in carrying on this department. We may mention at the outset that the children are not required to provide themselves with a spelling-book until they are able to read monosyllabic words with considerable ease. All that is needed on the part of the scholars, is a small slate with pencil, which is indispensable throughout the whole of the primary department; and, on the part of the teacher, a well equipped blackboard apparatus. The first stage, according to our system, is to teach the form or shape of the letters, and this is done by reducing them to their elements. Just as we would never think of teaching the children to read a sentence without, first of all, making them acquainted with the words, or of words without the letters, so would we impart a knowledge of the letters by teaching them the elements of the same. These may be reduced to three, the perpendicular and the horizontal straight lines, and the curve or circle. The first lesson then given is to teach the scholars to draw these lines and to continue drawing them, till they arrive at something like proficiency. In requiring them to make such lines, or figures, it were well to have some natural object to point to as a copy, at least for a few lessons. This, again, may be varied when the scholars have been two or three weeks at the exercise, by making them draw the simple Geometrical figures, either from prints or diagrams, on the Blackboard. Along with these exercises, they may be required from the lines they are now able to draw, with some correctness, to construct the various letters of the alphabet, and thereby become familiar with the shapes or forms, before they know anything of their sound or use. The next stage is the imparting of a knowledge of the powers or sounds of the letters as they are generally pronounced in reading. The letters are, as usual, first of all divided into vowels and consonants, and the latter are subdivided into labials, dentals, gutturals, nasals, &c.—terms borrowed from the organs of speech with which they are principally enunciated. Nothing is more interesting or amusing to the children than this lesson, and the understanding and feeling that the lips, teeth, palate, gums and nose are all brought into requisition in repeating the alphabet, and indeed every word they can express or articulate. The teacher will show by his own mouth, and the children following him, that *m* exhibits a pressure of the lips—that *b* and *p* also do so, and that these letters are called labials, because the word labial means something belonging to the lips. Also that *t* clearly shows the teeth—and this letter is called a dental. The man who pulls teeth and sets teeth, is called a *dentist*; dental, then, is something belonging to teeth. Every letter that occurs for the first time should be printed on the Blackboard, and pronounced first by the master or trainer, and then by the children simultaneously, and occasionally individually, as well as printed on the slate. The next stage is the formation of monosyllabic words. The old-fashioned monosyllables, *ab*, *cb*, *ib*, *ob*, or *ba*, *bc*, *bi*, *bo*, &c., are entirely discarded, as at once meaningless and uninteresting. At the very commencement of our course, as well as subsequently, our system demands the cultivation of the thinking powers of the young, according to their epoch of development, and this can only be done by bringing before their minds objects or things.—Accordingly, real monosyllabic words, with which the children are perfectly familiar, are formed. The vowels in their common sounds are regularly gone through with consonants prefixed and affixed, and these firmly rooted in their memory, before the scholars proceed to the more difficult sounds. The trainer calls upon the children to observe the form of his mouth, while he sounds *s—o* slowly and separately, which they repeat twice or thrice; then *s—o* a little more rapidly, and then *so*. The same order is followed with other consonants that form a real word, such as *l—o*, *l—e*, *lo*, *n—o*, *n—o*, *no*, *h—o*, *h—o*, *ho*, *g—o*, *g—o*, *go*.—These words, having distinct meanings, may be pictured out at this early stage by familiar illustrations, requiring the scholars to draw a lesson, moral when it can be done, but at all times intellectual. These exercises enliven and invigorate their mental and even bodily energies, and stamp the word or sign

more firmly on the memory, and greatly facilitate the acquisition of the letters. After the common sounds of the vowels have been thus gone through with the consonants placed before and after, the more difficult sounds are taken up in a succession of lessons,—picturing out an object or an action of an object in every lesson. The following simple and beautiful specimen of this picturing out is given by Snow on the action *ice go*. What is meant by, *ice go*? What motion do you make? You do not . . . sit or . . . stand when you go? The child shows how he goes, by walking probably; but the trainer may ask, Do you always walk when you go? The answer will most likely be, *yes*. The trainer, however, will not tell the child his error, but *bring it out* that he is wrong; and for this purpose may put one or two questions.—Were I to say *I go* to Paris immediately, would I walk the whole way? Could I say *I go*, when, perhaps, I might travel by railway or on horseback part of the way, and sail the rest in a ship? You thus train them to understand that *to go* is not simply to walk. The child sits too passively when he does not fill up an occasional ellipsis, and his mind is too much on the defensive by the mere question and answer system.—The whole process is better conducted on the gallery principle—with a dozen or twenty or fifty children than with one or two. This simple and progressive mode may be adopted with beginners, whether of three, five, or seven years of age; the great principle being ever kept in view, that *the understanding of the meaning should precede the committing of words to the verbal memory*. Unless this be done, the child will have the feeling of one walking in the dark, and the labour of committing to memory is rendered extremely irksome.

When the children have been engaged at this work for a month or six weeks, and are becoming pretty familiar with the sounds or powers of the vowels and consonants, they may then be taught the names of the twenty-six letters of the alphabet in regular order. Though the order is entirely an arbitrary arrangement, it is of great utility in consulting dictionaries, as well as for other practical purposes. The sounds are, however, still to be continued along with the names, not merely to facilitate their acquisition of the pronunciation of the words, but to exercise their lingual organs, that they may thereby possess in all time coming clearness and distinctness in articulation, which really lies at the foundation of all excellence in elocution. The two grand reasons, we believe, why good English reading is so rarely to be found, why it is practised in such a way as, by its rapidity, slurring, indistinctness, or monotony, it generally fails in making the impression intended by the words which are read, are, first, that the children have never been taught to exercise their lingual organs, so as to give a clear and distinct articulation and enunciation to every syllable; and, secondly, because they have been accustomed to read without the understanding of what is read,—and if they have not understood they cannot feel its force; and without feeling their cannot be good reading. But the matter of reading and spelling we shall take up in next number.

III.—OFFICIAL NOTICES.

1. For the information of all concerned, and to save the expense of answering numerous applications on the matter by post, we beg leave to intimate that the half-yearly Sessions of the Normal School commence on the second Wednesday of May and November, and close on the last Thursday of September and March respectively.
2. The quarterly Terms of the Model Schools commence the first of May, August, November and February. Those admitted during the course of the Term are required to pay the whole fee.
3. The Clerks of the different School Commissioners are again reminded that the law requires their Reports to be forwarded on or before the 31st December.
4. The Superintendent of Education requests the Clerks of

the School Boards to forward along with their general Report the Grammar School Returns for the two half-years ending 30th April and 31st December—and that the Secretaries of the Trustees of Academies forward to him a duplicate copy of their proceedings during the past year.

5. Will the Clerks be so kind as ascertain the exact number of children within each district capable of receiving instruction, that is, between 5 and 15 years of age. This is a matter of vital importance, as it is the only data whence we derive authentic information as to the quantity of education given.

6. It will be exceedingly obliging if the Clerks will find out the exact number of school districts within their bounds that possess no school houses at all, as well as the number that have school houses, but which are not tenurable in winter.

7. Will the Clerks state as correctly as they can the various Christian denominations to which the teachers within their respective bounds belong? There seems an unnecessary desecancy in the minds of some on this matter, as if it involved something inquisitorial. We see not how it should be accounted more so in Nova Scotia, than it is in New Brunswick or Upper Canada, and it is a matter of no small importance, bearing as it does so directly on the moral character of the teachers.

8. As it is desirable that the different educational institutions of the Province be fully reported, Dr. Forrester will be greatly obliged to the Secretaries of the different institutions to forward to him a full statement of the number of Professors and Students during the past year, the Income and Expenditure, &c., &c.

9. Are there any districts where the voluntary assessment principle for the support of schools is acted on, and with what effect?

10. Since the last report of the number of Pupil-Teachers at present attending the Normal School, four more have been enrolled, viz., Messrs. Daniel Macdonald, Sydney County, Duncan McPhail and Alex. McCrue, Inverness, and Charles Publado, Colchester. The first and last named are candidates for Grammar School Licenses. The whole number now enrolled is 76. Every seat is now occupied, so that should the number at subsequent Terms continue to increase, admission must either be refused or additional accommodation provided.

11. BOOKS.—It is hoped that the school books for the year have now all reached their destination, and that the greater proportion of them have been distributed by the Commissioners and Trustees of Schools as the law directs. It should always be borne in mind that this boon of the Legislature is designed for the poorer settlements, or for the poor in any settlement. If there are none, even of the latter description, the Commissioners are authorized to dispose of them at prime cost, the proceeds of course to be applied to similar objects. The Commissioners will observe that the whole, or almost the whole, of the books forwarded this year belong to the Irish National Series, according to the last Report of the Superintendent of Education on the subject. This Province has never before been in the same stage of advancement towards a uniformity in school books—a step, and an important step, towards a uniformity of system in the style of education. In itself it is of incalculable value for cheapening the expense of education to parents, for the benefit of the children attending school, and, still more, for furthering the efficiency of teachers in enabling them thoroughly to classify their pupils. It is earnestly hoped that Commissioners, Trustees, Teachers, Storekeepers and Parents will lend their aid in consummating and preserving this benefit.

A WORD TO TEACHERS ON THE RESPONSIBILITIES OF THEIR OFFICE.

In my last direct address I spoke of the motives by which you, as Teachers, ought to be actuated. I would now solicit your attention for a little to the responsibilities connected with your calling. During the six or seven hours of the day, when the children are under your charge, you are the representa-

tive of their parents, and you have thereby devolved upon you the deepest responsibility. You are responsible not only for what you do, but for what you neglect to do. And this responsibility you cannot shake off. Whatever were your views or feelings regarding your obligations, when you undertook the duties of your office, and whatever they are now does not affect the case. You have voluntarily assumed the relationship of a teacher, and so long as this relation remains all the responsibilities arising therefrom rest upon you. Hear the statement of Page:—"Just as true as it is a great thing to guide the mind aright,—just as true as it is a deplorable, nay fatal thing to lead it astray,—so true is it that he who attempts the work, whether ignorant or skillful, whether thoughtless or serious, incurs all the responsibility of success or failure,—a responsibility he can never shake off as long as the human soul is immortal, and men are accountable for such consequences of their acts as are capable of being foreseen. Going somewhat more into particulars, look at the compound nature of your scholars. You are in a measure, and for the time being, responsible for their physical health. No one, we think, who possesses any knowledge of the subject of Animal Physiology, and who calmly reflects on the general condition of our school rooms, can fail to be convinced that the seeds of many serious, and, ultimately fatal, diseases are implanted there. There may be no provision made for ventilation, and noxious malaria may be seating all around, there may be improper temperature, there may be badly constructed and disproportioned seats and desks, there may be high nervous excitement, by one or more of these the most fatal dart may be inflicted on the bodily frame of the inmates—and you are, to a certain extent, accountable. You may plead ignorance of the laws of animal physiology, but this does not release you from blame; it but makes your case all the more aggravated. You may plead your inability to remedy the evil, and you may denounce the careless indifference of parents, trustees, &c., but have you really used all the means within your reach to remedy the evil, or have you actually remonstrated with the parties more immediately concerned, as you ought? I have never yet met with an enlightened teacher, who had any knowledge of the laws of physical health, and realized to any extent the importance of maintaining these laws, alike for the success of his scholars and his own comfort, who has not effected much, aye, a great deal. But, again, you are in a great measure responsible for the intellectual growth and strength of your scholars. Now there are two things to be done for the accomplishment of this end, the communication of instruction, and the manner in which it is done. In other words, there is the instrument to be employed, and there is the use of the instrument. You are first of all responsible for the kind of knowledge you impart. Is that kind appropriate and congenial to the various powers or operations of the intellect? Is it such as will prove its adaptation to the generality of the vocations or professions that your pupils may follow? Or is it such as, by God's blessing, will satisfy their ever living longings and cravings? But you are still more responsible for the way in which that instruction is imparted, in which that food is administered. Do you then aim at the unfolding and expanding of all those powers which belong to this part of our mental constitution, and which naturally elevate man to a resemblance to his Maker? Do you really understand the philosophy and the art of effecting this end, the means you are to employ most in accordance with the nature of the intellect, and the practical use of the same? Are you thoroughly persuaded that, however valuable the imparting of sound, wholesome knowledge to the mind may be, it is not for a moment to be compared with the whetting, the cultivating and the strengthening of its varied powers, thereby rendering them susceptible of illimitable progression in those climes most congenial to their nature. Upon you mainly devolves the responsibility of all this, and who can adequately scan its height and its depth?

But, again, you are also, to a certain extent, responsible for the moral training of the children. I say to a certain extent, because it is confessed that, in this matter, very much depends upon the influence of their parents. Still, in your official capacity, you enjoy advantages arising from the important prin-

ciple of the sympathy of numbers denied to parents, and therefore you must also largely share with them the responsibility of the culture of the moral sense. Such being the case, let me ask you whether you possess correct, enlightened and enlarged conceptions of the nature, the sensibilities, the functions and the laws of that internal monitor styled the conscience, or that power by which we intuitively distinguish right from wrong, and are you well acquainted with the way by which this sense can be rendered increasingly sensitive, and thereby subserve the grand object of its existence? In the midst of its manifold imperfections, and its consequent inability to act as an infallible guide, at all times and in all circumstances, are you thoroughly persuaded that neither nature nor providence, however much they *may* assist, can adequately supply this deficiency; and that it is the Bible, and the Bible alone, that can do this? And, in order to this, are you labouring to bring your pupils in direct and immediate contact with this celestial light; and that, for this end, it is used, used as it is given, conveying moral and spiritual truth under natural or visible objects and things. And not only so, are you laboring to reduce its precepts to practice in the every day intercourse between you and your scholars, and, the scholars themselves, and do you make it the only infallible directory and standard of appeal,—the motive power in stimulating to diligence and good behaviour? Well aware that mere instruction will not suffice, are you striving to show in your conduct the sincerity of your own convictions, by an example of all that is pure and lovely, of all that is righteous and of good report, of all that is patient and persevering? And even after all this, are you satisfied that you have yet but used the means, and that, if you are to train morally, you must daily and hourly hold on in an unceasing repetition of the same act or acts, aye, and until the habit is acquired, and the character has been formed.

And now, upon a review of such solemn obligations, do you ask, "Who can meet and sustain such responsibility?" My answer is, the true inquirer after duty will not go astray.—He is insufficient for these things who is self-confident, who has not learned his own weakness, who has never found out his own faults, and who rushes to this great work 'as the unheeding horse rusheth to the battle,' not knowing whither he goeth. And, alas! how many are there in this position. Those, on the contrary, who are really desirous of improvement personally and professionally, who realize the arduousness of the duties of their calling, and their own incompetency to discharge them, who, in short, feel that they have a great, an honourable, and a useful work to do, and who are determined to press through every difficulty, to submit to every toil and sacrifice, to prepare and qualify themselves for its performance;—such have naught to discourage them,—such have every assurance of success,—for they are treading the vale of humility, and that is the path of safety.

We give below one of the most beautiful illustrations we ever read of the responsibility of the Teacher. It is the visit of Mr. Page, once Principal of the New York State Normal School at Albany, to Auburn State Prison. Would that the spirit it breathes were diffused throughout the breasts of all the teachers of this Province!

THE AUBURN STATE PRISON.

During my visit at Auburn in the autumn of 1845, I was invited by a friend to visit the prison, in which at that time were confined between six and seven hundred convicts. I was first taken through the various workshops, where the utmost neatness and order prevailed. As I passed along, my eye rested upon one after another of the convicts, I confess, with a feeling of surprise. There were many good-looking men. If, instead of their parti-colored dress, they could have been clothed in the citizen's garb, I should have thought them as good in appearance as laboring men in general. And when, to their good appearance, was added their attention to their work, their ingenuity, and the neatness of their work-rooms, my own mind began to press the inquiry, *Why are these men here?* It was the afternoon of Saturday. Many of them had completed their allotted work for the week, and with happy faces were performing the customary ablutions

preparatory to the sabbath. Passing on, we came to the library, a collection of suitable books for the convicts, which are given out as a reward for diligence to those who have seasonably and faithfully performed their labor. Here were many who had come to take their books. Their faces beamed with delight as they each bore away the desired volume, just as I had seen the faces of the happy and the free do before. *Why are these men here?* was again pressed upon me;—*why are these men here?*

At this time the famous WYATT, since executed upon the gallows for his crime, was in solitary confinement, awaiting his trial for the murder of Gordon, a fellow-prisoner. I was permitted to enter his room. Chained to the floor, he was reclining upon his mattress in the middle of his apartment. As I approached him, his large black eye met mine. He was a handsome man. His head was well developed, his long black hair hung upon his neck, and his eye was one of the most intelligent I ever beheld. Had I seen him in the senate among great men,—had I seen him in a school of philosophers, or a brotherhood of poets, I should probably have selected him as the most remarkable man among them all, without suspecting his distinction to be a distinction of villany. Why is that man here? thought I, as I turned away to leave him to his dreadful solitude.

The morrow was the Sabbath. I could not repress my desire to see the convicts brought together for worship. At the hour of nine I entered their chapel, and found them all seated in silence. I was able to see most of the faces of this interesting congregation. It was by no means the worst looking congregation I had ever seen. There were evidently bad men there; but what congregation of *free* men does not present some such?

They awaited in silence the commencement of the service. When the morning hymn was read, they joined in the song, the chorister being a colored man of their own number. They sang as other congregations sing, and my voice joined with theirs. The Scripture was read. They gave a respectful attention. The prayer was begun. Some bowed in apparent reverence at the commencement. Others sat erect, and two or three of these appeared to be the hardened sons of crime. The chaplain's voice was of a deep, perhaps I should say, a *fatherly* tone, and he seemed to have the father's spirit. He prayed for these "wayward ones," who were deprived of their liberty for their offenses, but whom God would welcome to his throne of mercy. He prayed for their homes, and for their friends who this day would send their thoughts hither in remembrance of those in bonds. He alluded to the scenes of their childhood, the solicitude of their early friends, and the affection of their parents. When the words *home, friend, childhood*, were heard, several of those sturdy sons of crime and wretchedness instinctively bowed their heads and concealed their faces in their hands; and as a *father's blessing* and a *mother's love* were alluded to, more than one of these outcasts from society, were observed to dash the scalding tear from the eye. These men *feel* like other men,—*why are they here?* was again the thought which forced itself upon my mind; and while the chaplain proceeded to his sermon, in the midst of the silence that pervaded the room, my mind ran back to their educators. Once these men were children like others. They had feelings like other children, affection, reverence, teachableness, conscience,—why are they here? Some, very likely, on account of their extraordinary perversity; but most because they had a wrong education. More than half, undoubtedly, have violated the laws of their country not from extraordinary viciousness, but from the *weakness* of their moral principle.—Tempted just like other and better men, *they fell*, because in early childhood no one had cultivated and strengthened the conscience God had given them. I am not disposed to excuse the vices of man, nor to screen them from merited punishment; neither do I worship a "painted morality," based solely upon education, thus leaving nothing for the religion of the Bible to accomplish by purifying the heart, that fountain of wickedness; yet how many of these men might have been saved to society; how many of them have powers which under different training might have adorned and blessed their

race; how many of them may date their fall to the evil influence and poisonous example of some guide of their childhood, and some recreant teacher of their early days,—God only knows! But what a responsibility still rests upon the head of any such teacher, if he did not know, or did not try to know, the avenue to their hearts; if he did not feel or try to feel the worth of moral principle to these very fallen ones! And what would be his feelings if he could look back through the distant days of the past, and count up exactly the measure of his own faithfulness and of his own neglect? This the all-seeing eye alone can do,—this He who looketh upon the heart ever does!

Teachers, go forth, then, conscious of your responsibility to your pupils, conscious of your accountability to God, go forth and teach this people; and endeavor *so to teach*, that when you meet your pupils, not in the walks of life merely, not perhaps in the Auburn Prison, not indeed upon the shores of time, but at the final Judgment, where you must meet them all, you may be able to give a good account of the influence which you have exerted over mind. As it may then be forever too late to correct your errors and efface any injury done, study now to set the part of wisdom and the part of love.

Study the human heart by studying the workings of your own; seek carefully the avenues to the affections; study those higher motives which elevate and ennoble the soul; cultivate that purity which shall allure the wayward, by bright example, from the paths of error; imbue your own souls with the love of teaching and the greatness of your work; rely not alone upon yourselves, as if by your own wisdom and might you could do this great thing; but seek that direction which our heavenly Father never withhold from the honest inquirer after his guidance,—and though the teacher's work is, and ever must be, attended with overwhelming responsibility, **YOU WILL BE SUFFICIENT FOR THESE THINGS.**

IV.—EDUCATIONAL INTELLIGENCE.

COLONIAL.

NOVA SCOTIA.

The Rt. Hon. the Earl of Mulgrave and suite, Lord Bury, the Hon. Stanley Brown, Receiver General, and the Hon. John Marshall, Financial Secretary, and the Chairman and Commissioners of the Railway Board, visited the Provincial Normal School on the 6th inst., and spent upwards of two hours in the College and Model Schools. This is the second time that the Lieutenant Governor has visited this Institution, and both on this and the former occasion His Excellency expressed himself highly delighted with what he saw and heard. It must be a source of peculiar gratification to every true friend of Nova Scotia, as well as to every genuine philanthropist, to observe the deep interest manifested by the Lieutenant Governor in our Educational Institutions. It is but a few days since it was announced in the papers that his Excellency, accompanied by the Countess of Mulgrave, had visited the Deaf and Dumb Institution and the Acadian and National Schools, Halifax. And all this not in a mere formal character, but with a sincere desire to countenance and encourage and stimulate these public undertakings, upon whose success so much of the social, economic and moral welfare of the whole population depends.

GENERAL SIR WILLIAM FENWICK WILLIAMS OF KARS.—King's College, Windsor, has conferred on this distinguished officer the Degree of D. C. L. in honour of his military exploits.

KING'S COLLEGE, WINDSOR.—From the Calendar of 1858, which was kindly forwarded to us some weeks ago, and which

we have perused with very high satisfaction, we learn that this Institution is at present in a very efficient condition. Five Professors, including the President, compose the Faculty, and these are gentlemen of great energy of character, and some of them possessed of high scientific attainment. We regret to see that so few comparatively avail themselves of the advantages to be derived from this Seminary of learning. Last year only 25 students were enrolled. The Calendar itself is admirably arranged, and contains a full account of the management and proceedings both of the College proper and of the Collegiate School. Would that we had a similar document from all the other Collegiate Institutions of the Province.

V.—REVIEWS OF SCHOOL BOOKS.

A TREATISE ON ARITHMETIC, IN THEORY AND PRACTICE. By James Thomson, L.L.D., late Professor of Mathematics in the University of Glasgow. Thirty-ninth Edition. Belfast: Simms & McIntyre. 1857.

Mathematical Science is pre-eminently subservient to the wants of civilized society. In addition to its own especial province of magnitude and number, which it investigates and unfolds in direct adaptation to oft-recurring necessities, to which of the other sciences is it not the pioneer, or the ministering angel? But we may not rest here; for besides furnishing us with a vast amount of knowledge of external objects, and solving problems of the first practical importance, how great is the subjective influence which mathematical studies exercise on the mind. The educator entirely misapprehends the power of the instrument placed in his hands, if he regards the study of Arithmetic, Algebra, Geometry, or any other department of Mathematics, as merely adapted to qualify the pupil for some particular pursuit in life. The smith's apprentice, as he wields the ponderous hammer, is not simply learning to give shape to a piece of iron; in addition to this, he is imparting to that slender arm of his, strength and power of endurance. So do mathematical studies unfold the mind, give it power of concentration and continued action, and train it to pursue its way steadily in the face of every opposition. That boy who sits at his desk, sweating over his knotty "sum," jotting down his long columns of figures, trying again and again after repeated failures, until, summoning all his resolution and powers of mind, he determines not to be beaten, and in the end rejoices in the "answer," is acquiring a perseverance and a fortitude which will enable him to meet the difficulties of life with coolness, resolution, and an unyielding determination to overcome every obstacle.

It is truly pitiable and deplorable to see how these important studies are neglected, we may almost add ignored, in many of our fashionable female boarding schools. The "finished" Miss returns home as truly ignorant of Arithmetic, as she would feign appear to be of all domestic duties, both of which she characterizes as equally vulgar and unbecoming for a young lady of taste and refinement.

Pursuant to ideas already presented, we regard the direct benefits of Arithmetic as two-fold: As the means of computation, and a potent agent in mental training. The former is the only object usually contemplated. On the contrary, the study of this branch of learning should ever contemplate both these ends as primary, and it should ever be pursued in direct subserviency to both. Indeed the measures best adapted to promote the one, will most effectually secure the other. We fail in making boys good arithmeticians, because we neglect to treat them as the lawful possessors of thinking minds—because we aim to stereotype them into a certain rote system which may enable them to solve all the questions "in the book,"—except perhaps the Miscellaneous Collection;—but which will leave them bewildered and impotent in an unbeaten path. In plain words, the pupil is taught to obtain the

"answer" by imitation and memory, instead of being taught to solve the question by the exercise of his reasoning faculties.

It is in harmony with such views that we desire to introduce to the notice of those to whom it may be necessary, the treatise on Arithmetic, placed at the head of this article. It is gratifying to know that this book is already much used in our schools, and that its merits are too well known by many teachers in Nova Scotia, to require any eulogy at our hands. It is not necessary to say that the book is complete—embracing all that a school Arithmetic should contain, or that it is perfect in what it comprehends; but comparing it with others in the field, it may unhesitatingly be affirmed, that all things considered, it is the book best adapted to the wants of our schools. The book is of moderate size, yet it contains the principal rules of practical importance. It is admirably adapted to aid the efficient teacher in securing those ends which we have pointed out, as the legitimate aim of Arithmetic. The rules laid down are such as give the required result, with the least possible expense of time and labor, and much facility is afforded the teacher to make the process intelligible, and a training exercise to the mind.

One of the most beautiful and characteristic features of the book, is the diversity in the application of general principles, in adaptation to individual cases. The observing faculties of the pupils are called into exercise, by his being taught to look about him and discover the peculiarities of each question; and then his ingenuity and understanding are taxed to find out how he may best adapt himself to those peculiarities, and attain his end most easily. The pupil is thus learning the most ready method of solving the question, and at the same time his mind is acquiring a power of thought and adaptation to circumstances.

Many examples could be given in illustration of this feature of the book: we select one from simple multiplication:—"If the multiplier be a little less than 100, 1000, or any other number expressed by a unit with ciphers annexed, which number may be called the approximate multiplier; or if it be a little greater than one of these numbers, take the difference between it and the approximate multipliers; in the former case, call this difference the complement, in the latter, the excess; then to the multiplicand annex as many ciphers as there are in the approximate multiplier; and in the one case subtract from the result the product of the multiplicand and the complement, in the other, add to the result the product of the multiplicand and the excess."—p. 31.

Let us now suppose the number to be multiplied 8642877, and the multiplier 99925. The pupil perceives that his multiplier is 100000 minus 75, and he therefore takes 100000 as the approximate multiplier. From the product of the approximate multiplier, and the multiplicand, he subtracts 75 times the multiplicand. But he has previously been shown that the most convenient mode of multiplying by 75 is to multiply by 300 and divide by 4. Hence the whole process may be performed in the following succinct space—containing only about half the figures in the common method:—

$$\begin{array}{r}
 864287700000 \\
 \hline
 2592863100 \quad - \text{product by } 300 \\
 \hline
 648215775 \quad - \text{product by } 75 \\
 \hline
 8642228784225 \quad - \text{product of } 8642877 \text{ by } 99925
 \end{array}$$

In conclusion, we would only add that school-books are but tools, the teacher is the workman—the agent. The unskilful will, with every attainable assistance, accomplish but an inferior piece of work, while the man who understands his business allows nothing disgraceful to leave his hands, though he labor under great disadvantages.

THE GEOGRAPHY AND HISTORY OF BRITISH AMERICA, &c., by J. George Hodgins, A. M. (See Advertisement.)

Hitherto, almost without exception, the geographies which

have been used in our schools have come to us from the neighboring Republic, or from beyond the Atlantic. Both classes, however excellent in many features, are alike deficient in Colonial information.

So extensive are the plains, so high the mountains, so broad the lakes, so long the rivers, so verdant and fruitful the fields, so many and so populous the cities, and so free and excellent the institutions of the United States, that its authors, exhausted with the details of their own country, are able for only a hasty glance at other lands.

Scarcely do the Colonies receive more attention at the hands of British authors. These make Europe three-fourths of the world, and put the Colonies in a nut shell. Standing amid the blaze of civilization, or gliding swiftly on in the car of improvement, they can but dimly see us—fellow citizens of the red man—obscured alike by the sombre shadows of barbarism and unexplored forests.

Hence, if we want geographies containing information respecting our own country, we must make them for ourselves. And truly, to every person, the geography of his own country is decidedly of the first importance, and claims his best and most minute attention. We therefore hail the contribution of Mr. Hodgins to our school literature, as most opportune and as calculated to supply a serious defect in the text books on general geography universally used.

The author begins with a brief sketch of the general principles of geography, proceeds upon the system of outline until he comes to British America—his grand subject,—when, commencing with Canada, he takes up the Colonies seriatim and in detail, giving at the conclusion of each a sketch of its history. This last is an important feature of the work, as history and geography mutually illustrate, and hence should accompany, each other. The book is neatly bound and tastefully illustrated with engravings.

We would have considered it as an important improvement had there been a few historical facts interspersed with the geographical outline, and also if the outline system had been carried a little farther with the Colonies before taking them up in detail. However, such defects can be supplied orally by the efficient teacher, and the book will then afford for our schools an excellent text book on British America, although not calculated to precede the necessity of a special geography of Nova Scotia.

AN ELEMENTARY COURSE OF NATURAL AND EXPERIMENTAL PHILOSOPHY, for the use of High Schools and Academies. By T. Tate, F. R. A. S., of Kneller Training College, England. Revised and improved by C. S. Cartie, A. M. Boston: Hickling, Swan & Brewer, 1857.

Amid the multiplicity of treatises on Natural Philosophy, both on this and the other side of the Atlantic, there are few, if any, more valuable than Tate's. There are many more elaborate publications on the philosophy of some of the branches, but we know of none that combines such a clear exposition of the *theoretic* with such a fulness and appropriateness of the *experimental*. In addition to the subjects usually embraced in Natural Philosophy, there is an article on Experimental Chemistry, which contains a very simple and beautiful exposition of the leading principles of that branch of Natural Science. The book is thus peculiarly well adapted for High Schools and Academies, and is recognized as a standard work throughout Britain, being one of the books recommended by the Lords of the Privy Council. It seems considerably improved by the revision of Mr. Cartie. We believe the American educationists are under a debt of obligation to Hickling, Swan & Brewer for republishing this work, and still more for executing it in such a handsome, substantial manner. Indeed, all the school books, that we have inspected, published by this firm are both in their character and execution of a high order.

AGRICULTURAL.



I.—THEORY OF AGRICULTURE.

We have now at some length brought before our readers the subject of soils—their origin, composition and application—as well as the general features and characteristics of the soils of Nova Scotia. Our extracts have been mainly drawn from Principal Dawson's "Contributions towards the improvement of Agriculture in Nova Scotia," which contains a large amount of valuable scientific and practical knowledge. We now proceed to the subject of Manures,—a subject perhaps of even greater importance to the farmer than soils. These are usually divided into two great classes, *organic* and *inorganic* or *mineral*. We of course begin with the former. Were the following remarks by Dawson on the subject of stable manures carried into effect throughout the Province, it has been computed that a saving of at least £100,000 per annum would be secured.

ORGANIC MANURES.

Under this head, I group all those fertilizing substances which have formed parts of animals or plants, and are restored to the soil, whence, or by the aid of which, they were obtained; though some of them cannot, in strict chemical language, be termed organic.

Stable Manures.—Agricola long ago said, "More than one-half of the manure made in the Province, is absolutely wasted, from ignorance and inattention; and the other half is much more unproductive than it would have been under more skillful direction. We have almost no pits, dug upon a regular plan, for the collection and preservation of the dung which, from time to time, is wheeled out of the barn. Sometimes it is spread out on the green sward; sometimes cast carelessly in a court, or adjoining yard; but seldom is an excavation made, purposely for retaining the juices which run from it. These are suffered either to stream along the surface, or sink into the earth; and in either case, their utility is sacrificed to inattention or ignorance. This is no more, however, than half the evil. The exhalations which arise from the ardent influence of the summer's sun, or from the natural activity of fermentation, are permitted to escape freely, and to carry with them all the strength and substance of the putrescible matter." There is, do doubt, much more attention given to this important subject just now; but still, the waste of barn-yard manure, both solid and liquid, is a great loss, and a fruitful cause of agricultural poverty, and failures of crops. About two years ago, I had referred to this subject in a public lecture, and happened, immediately afterward, to drive ten or twelve miles into the country, with an intelligent friend, who doubted the extent of the loss. We were driving through one of the oldest agricultural settlements in the Province, and by way of settling the question, determined to observe the capability of each barn yard that we passed, for the preservation of manure. It was in early spring, and we found scarcely one barn that had not its large manure heap perfectly exposed to the weather, and with a dark stream oozing from its base into the road-side ditch, or down the nearest slope; while there was evidently no contrivance whatever for saving the liquid manure of cattle. Here was direct evidence, that a large proportion, probably not less than one third, of the soluble part of the solid manure, and the whole of the liquid manure, which all agricultural chemists think to be at least equal in value to the solid part, was being lost. In other words, each

farmer was deliberately losing between one-half and two thirds of the means of raising crops, contained in his own barn-yard. What would we think of a tradesman or manufacturer, who should carelessly suffer one half of his stock of raw material to go to waste; and the case of such farmers is precisely similar. The results of chemical analysis will enable us to form more precise ideas of the nature and amount of this waste.

Composition of Solid Stable Manure (Richardson.)		Composition of Liquid Manure (Bossingault.)		
		Horse.	Cow.	
Carbon,	37.40	Urea,	31.00	18.48
Hydrogen,	5.27	Hippurate of Potash,	4.74	16.51
Oxygen,	25.52	Lactate of Potash,	20.09	17.16
Nitrogen,	1.76	Carbonate of Mag-		
Ashes,	30.05	nesia,	4.16	4.74
	100.00	" of Lime,	10.82	0.55
		Sulphate of Potash,	1.18	3.60
		Chloride of Sodium,	0.74	1.52
		Silica,	1.01	—
		Water, &c.,	910.76	921.32
			1000.00	1000.00
Composition of the Ashes of Stable Manure (lb)		Urea, the principal organic ingredient of Urine, consists of—		
Potash,	3.22	Carbon,	20.0	
Soda,	2.70	Hydrogen,	6.6	
Lime,	0.34	Oxygen,	46.7	
Magnesia,	0.26	Nitrogen,	26.7	
Sulphuric Acid,	3.27		100.0	
Chlorine,	3.15			
Silica,	0.04			
	100.00			
Phosphato of Lime,	7.11			
" of Magnesia,	2.26			
" of Ox of Iron,	4.68			
Carbonate of Lime,	9.34			
" of Magnesia,	1.63			
Silica,	27.01			
Sand, &c.,	31.96			
	100.00			

In the above table, we see that the liquid manure contains large quantities of potash and soda; and that a large portion of it is urea, a substance very rich in nitrogen, and, in fact, quite similar to the richest ingredients of guano. Johnston estimates the value of 1,000 gallons of the urine of the cow, to be equal to that of a hundred-weight of guano. The farmers of Flanders,—who save all this manure in tanks,—consider the annual value of the urine of a cow, to be \$10.

In the solid manure, we perceive that there is little nitrogen.—This element, so valuable for producing the richer nutritious parts of grain and root crops, is principally found in the liquid manure. The little that is present, however, in the solid manure, is soon lost, in the form of ammoniacal vapors, if the dung be allowed to ferment uncovered. The other organic matters are less easily destroyed, unless the dung be allowed to become "fire-fanged," in which case the greater part of it is lost. In the ashes, or inorganic part, we find all the substances already referred to, as constituents of fertile soils; and many of the most valuable of them are, as the manure decomposes, washed away, and, along with a variety of organic matters, appear in the dark-colored water which flows from exposed dung hills. It is not too much to say, that the loss of the volatile and soluble parts of manure, on ordinary upland soils, cannot be repaid by any amount of outlay in the purchase of other manures that our farmers can afford: and we can plainly perceive, that the prevailing neglect in this one particular, is sufficient to account for the deterioration of once fertile farms. How, then, is this waste to be prevented? In answer to this, I shall merely indicate the principles on which the means adopted for saving manures should be founded, with a few general hints on the best modes of carrying them into effect.

1. The solid manure should be covered by a shed, or roof, sufficient to protect it from rain and snow. Its own natural moisture is sufficient to promote, during winter, a slow and beneficial fermentation. Snow only prevents this from going on; rain washes away the substance of the fermented manure.

2. The ground on which the manure heap rests, should be hollowed, and made tight below with clay or planks; and in autumn a thick layer of bog mud, or loam, should be placed on it, to absorb the drainings of the manure.

3. When the manure is drawn out to the field, it should be covered as soon as possible, either in the soil, or, if it must stand for a time, with a thick coating of peat or loam,—a pile of which should be prepared in autumn for this purpose. All unnecessary exposure should be avoided.

4. Where gypsum can be procured cheaply, it should be strewed about the stables, and on the manure heap, for the purpose of converting volatile ammoniacal vapors into fixed sulphate of ammonia.

This will also render the air of the stables more pure and wholesome.

5. It must be borne in mind, that the richest manures are the most easily injured. For example, many farmers think horse manure to be of little value. The reason is, that when exposed it rapidly enters into a violent fermentation and decay, and its more valuable parts are lost. Such manures require more care than others, in protection and covering, so as to moderate the chemical changes to which they are so liable, and to save the volatile and soluble products which result from them.

6. The liquid manure should be collected, either in the pit or hollow intended for the other manure, or in a separate pit prepared for the purpose. The latter is the better method. If a tight floor can be made in the stable, it should be sloped from the heads of the cattle, and a channel made, along which the urine can flow into the pit. If the floor is open, the pit should be directly beneath it, or the ground below should be so sloped as to conduct the liquid into the pit. In whatever way arranged, the pit should be tight in the bottom and sides, and should be filled with soil, or peaty swamp mud, to absorb the liquid. Gypsum may also be added with great benefit, and the urine pit may very well form a receptacle for floor cleanings, litter which may accumulate about the barn and every other kind of vegetable or animal refuse. These additional matters may occasionally be protected, by adding a new layer of peat or soil to the top. The pit, for liquid manure should be roofed over. A method much followed in Britain and the continent of Europe, is to collect the urine in a tank, and add sulphuric acid to prevent waste of ammonia. When used, the liquid is diluted with water, and distributed to the crop by a watering cart. This is too expensive for most of our farmers; but when it can be followed, it will be found to give an astonishing stimulus to the crops, especially in the dry weather of spring. Gypsum may be put into the tank, instead of sulphuric acid.

II.—PRACTICE OF AGRICULTURE,

CHOICE OF CATTLE.

This is a branch of Agriculture which every farmer should study and make himself acquainted with. Ignorance of the subject entails an immense loss of property to the Province every year. The introduction of new breeds of stock is an essential element in the improvement of this department, but the benefit arising from freshly imported kinds of horses or cattle or sheep will be but of temporary duration, unless great care and attention are bestowed on them both in their housing and feeding, as well as in a proper selection of their progeny. Indeed were this latter point attended to, there would be little or no necessity, save at distant intervals, for the introduction of new stock into any country. But all this involves no small amount of knowledge and practical experience of what constitutes the best properties of stock according to the purposes for which they are reared, and thereby making a suitable selection.

The above description of the several breeds will be useful in this respect; but there are a number of subordinate points well deserving of attention, and which can be reduced to the form of rules. The following are copied almost verbatim from Youatt.—

"The first object of attention is to consider the proportion between his stock and the quantity of food that will be necessary to support it. The nature, situation, and fertility of the soils that compose his farm are equally worthy of notice, as well as the purpose for which he designs more particularly to rear or feed his cattle, and chiefly, whether for the dairy or with the view of supplying the markets. It will be expedient to observe the greatest exactness in these proportions, because in case he should overstock his land, he will be compelled to sell before the cattle are in a fit state for market, and, consequently at certain loss, while on the other hand, he will incur a diminution of his profit if he should not stock his land with as many cattle as it will bear."

"He should next endeavor to procure thoroughly good male animals, an extra ten or twenty pounds is always well bestowed thus, and he should decide on the breed or breeds he intends to keep; by purchasing and breeding from various different breeds indiscriminately, he will never have a good animal, and eventually his herd will be mongrels. Neither must he pursue the *in and in* system to any extent, or he will find his stock deteriorate rapidly.

As points deserving of careful consideration in the purchase of cattle, especially those intended for fattening, the following are enumerated:—

(1) *Beauty or symmetry of shape.*

(2) *Utility of form.*—The head should be fine and small, tapering towards the mouth. Few good milkers or feeders are without this fineness of muzzle. The neck should also, be fine, but may thicken rapidly toward the shoulder. The chest should be deep and broad, and the back broad and level, and the animal ribbed almost home. The loins should be wide at the hips but not prominent; the thighs full long, and near together; and the legs short. The bones of the legs should be small, the hude mellow, but not loose—everywhere covered with hair soft and fine, but not effeminately so.

(3) *The flesh*—of course varies with age and food. It should, however, be marbled or intermixed with fat and lean; and when alive, should feel firm and mellow or elastic, and not hard or flabby.

(4) *Cattle from richer or better ground* should not be purchased for poor or medium farms. The farmer should select such animals as have been found to suit the soil or keep he has for them. This last, however, should be improved if possible.

(5) *Dexterity of disposition* is an object of great moment. Independently of its other advantages, tame beasts require less food to rear, support, and fatten them. Gentle, kindly, equable treatment will most effectually conduce to this end; and stock so treated are more valuable than those that have had their tempers spoiled by bad treatment.

(6) *Hardiness of constitution*, is a matter of some importance. Cattle with arched ribs and wide chests and backs, are more likely to prove hardy than those that have their fore-quarters narrow.

(7) *Early maturity* is also valuable, but it can only be maintained by feeding young cattle in such a manner as to keep them constantly in a growing state. A good breed well fed in winter, will thrive more in three years than in five with insufficient food in winter. It seems to be a generally received opinion that small cattle have a stronger disposition to fatten than the larger breeds, and will produce more meat per acre.

(8) *The Age of Cattle* may be estimated by the teeth and horns: "Neat cattle cast no teeth until they are turned two years old, when they get two new teeth. At three they get two more; and in every succeeding year two more, until five years years old, when they are called full mounted; though the two corner teeth which are lost in renewal, are not fully up until they are six.

"When two years old, the horns are without wrinkle at the base, but at three years old a circle or wrinkle appears, to which another is added every year, so that by adding two to the number of rings the age may be ascertained, unless the rings have been scraped or filed away. These circles must not be confounded with other ringlets sometimes found at the base of the horns, and which are a tolerably sure indication that the animal has been ill fed during its growth; another frequent consequence of which is that the horns are crooked and unsightly. There is also a tip at the extremity of the horn, which falls off about the third year."

COMPARATIVE MERIT OF BREEDS.

The following judicious remarks are from Dawson:—

On this subject I may observe that experience in this Province and the neighboring colonies and states, in so far as I am acquainted with it, indicates; that for fattening stock on marsh or rich upland farms, the Durham, short-horn takes precedence of the other imported breeds. The Herefords have also been tried, but not with the same success. The Devon has, in this country as in England, proved excellent for draught, but inferior to the Durham for early fattening. For dairy purposes the Ayrshire and Alderney must take the highest place.

The Galloway and Highland cattle are not now to be found here in a state of purity, and there can be little doubt that the introduction of good specimens of these cattle, as fattening stock for upland farms, would be very useful. As dairy cattle, the Yorkshire variety of the short-horns, and the Suffolk polled, appear to deserve a trial.

Many individuals of the mixed breeds which prevail in this Province, and have long been naturalized in it, are of excellent quality; and attention to the points and treatment mentioned under subsequent heads, and by judicious crossing with the imported breeds, herds may be secured equal to those of any country, and well adapted to our climate. Our native cattle have suffered much from want of care in selecting the best animals to breed from, insufficient food when young, and bad winter keep; but many of them still possess some of the most important characters of good animals, and will show them under good treatment; while on the other hand, with careless management, the best foreign breeds will become unprofitable and degenerate.

STALL AND BOX FEEDING.

In fattening cattle, stall-feeding should commence when the ani-

mals are half or three parts fat, a condition to which they can attain on good pasture. Of course, however, the remarks under this head apply to the method of soiling already mentioned, as well as to the winter feeding, which forms so important a part of the farmers' cares in this country. "Of all vegetable productions, good hay is undoubtedly the best for fattening cattle; in ordinary circumstances, however, it is necessary to have recourse to other things in combination with it, as cabbages, carrots, turnips, beets and other succulent plants. Barley, rye, oat or pea meal, if mixed together, with the occasional addition of a small quantity of bean meal, may likewise be given to advantage, in the proportion of a quarter, or at most half a peck to each beast, along with hay. Of hay it may be observed, that that which is salted, even if of somewhat inferior quality, is preferable to that which is unsalted." The comparative value of the different roots, &c., will be mentioned under another head.

Various kinds of prepared food are in use for cattle, the principal of which are the following:—

Flax seed when crushed and boiled to a jelly. There is probably nothing equal to this for rapidly fattening cattle.

Three parts bean; pea, oat or barley meal, with one part of linseed meal made into a jelly, form an excellent food.

Turnips, carrots, mangel-wurtzel, cabbage, &c., when boiled and mixed with flax-seed meal, form another useful variety.

3½ gallons water
2 lbs. linseed meal.
5 lbs. barley meal.
10 lbs. chaff.

(From the *New England Farmer* for November.)

We think it is not well to allow the cattle to roam over the fields after this time, browsing the trees, and shivering with the cold, even if there is no snow on the ground. They may, it is true, pick up a part of their living, but they waste their manure, and get roaming habits. They had better be kept in the barn and yard, and fed from the ample store which has been provided for them. Take good care of them in the early part of the season, and get them accustomed to quiet habits, and they will not fret off the flesh which they have accumulated in the pasture. Give them plenty of salt, a mess of root daily, and a foddering of corn stalks, or husks. A variety of food is agreeable to them, and promotes their appetite.

Cattle that are being stall-fed require particular attention. Do not surfeit them with too large quantities of food. Give them no more at one time than they will eat up clean. Pumpkins and apples, with shorts and meal, make a good variety of food. Use up the perishable articles first. If your hay is not of the best quality, be sure and cut it and moisten it and mix the meal and shorts with it. Give them plenty of good bedding and keeping them clean.

HINTS ON KEEPING SHEEP.

It has been stated in some of the agricultural papers of the day, that sheep are profitable to the farmer, not only from the product of wool and mutton, but from the tendency which their keeping has to improve and enrich his land for all agricultural purposes.

Sheep are profitable to the farmer who has a broken or uneven farm, and his pastures have been suffered to grow up to bushes, or where the soil has become exhausted by excessive feeding, and will produce more of the grasses, excepting what the *New England Farmer* term June grass or white top. Land that has been thus reduced will keep sheep better than any other kind of stock; but to think of eradicating the husks, and thereby give the pasture a smooth appearance, and have white clover flourish in the place of June grass, is a supposition not generally acknowledged by the community, where experience has proved to be the better teacher in regard to what kind of stock will best improve our land.

For instance, where a pasture is in good condition and produces clover, timothy and red-top, let it be stocked with sheep, and in most of our hill towns in Cheshire county, or even in the State, in fifteen or twenty years, timothy or clover will be nearly or quite eradicated, excepting where the sheep may chance to lay, which is generally on the brow. In those localities white clover may flourish to some extent, but it will be refused by the animals; therefore, it will be of no practical utility to the pasture unless a portable fence is substituted, and that would not pay in so rough a country.

It has been supposed by some that as many cattle and horses can be kept with a certain portion of sheep as without them, and without any injury to the farm for other purposes. One writer states that a proportion of six sheep to a horse and cow on the same keeping; that would be allowing about one-fifth so, rubbish for the sheep, on which to feed; consequently, the quality of hay must be an inferior kind.

Sheep kept on rubbish left by other animals, may survive but cannot flourish in the winter season, without extra feed. In grazing time, sheep don't stop to crop the rubbish until they have exhausted their curiosity in search of clover or some of the best grasses, and in a pasture that will keep six sheep, one horse and one cow, the sheep, I venture to say, will consume one-half of the clover in an ordinary pasture. Consequently, instead of eating the poorest, they will consume the very best of the feed.

The farmer is more subject to loss on sheep than on neat stock, very few wool growers, who keep from one to two hundred sheep, but will realize a loss annually of ten per cent. Although constant care and attention to their wants are carefully looked after, yet disease overtakes numbers of the flock; while they are treated with the utmost vigilance as rare animals it would do very well; but this is practical only with a very limited stock.

Let the principle be observed, for experience has shown that between sheep well and tolerably fed, there is a difference of one-third, in regard to the quantity of wool obtained. And then again, it is only by such abundant food that the smallest amount of mortality as well as the largest increase, and that development of their animal organism which gives the sheep in all periods of its age the highest capacities of breeding and fattening, can be secured.

J. WHITNEY.

East Sullivan, N. H.

MANGOLD WURTZELS.

MR EDITOR:—For some time past, I have been desirous of placing before the readers of the *New England Farmer* a statement concerning the raising a mangold wurtzels. Every farmer is interested in the production of all articles by which he can the better improve the condition of his stock, and if by the production of these vegetables he can do that, he will give his attention to it.

For the past two years I have raised mangold wurtzels, for the purpose of trying the experiment, and of satisfying myself as to the profitability of the production. This year I planted a small piece, 4 rods by 5, containing one-eighth of an acre of land. I plowed the land last fall and put on a good coat of manure. This spring I cross-plowed and harrowed it. I planted the seeds in hills one and a half feet apart. Many of the seeds, owing to the wetness of the spring, or from some other cause, rotted, and did not germinate, and plants from other hills were transplanted to supply the deficiency. The weeds were kept down by hoeing two or three times during the summer. This fall I gathered 160 bushels from the piece of ground. Many of them were very large, weighing from 12 to 15 pounds; and one measured 29 inches in circumference, and weighed 16½ pounds. Many of them measured 25 inches in circumference. At this rate 1280 bushels can be raised from the acre, or allowing only 1000 bushels to the acre, which I consider a moderate crop, for land under good cultivation, can farmers raise anything which will be more profitable? I planted these roots on moist land, and am satisfied that I cannot raise anything so profitable for stock from the same piece of land. I hope the farmers in this vicinity will consider this subject, and try the experiment, to satisfy themselves of the expediency of raising these roots for their stock.

If none of the seeds had rotted, I am satisfied that the crop would have been larger, for none or those which were transplanted grew as large as those which remained in the original hill.

Epping, N. H., Oct. 9th, 1858.

N. V. P.

HOW TO MANURE TREES IN GRASS LAND.

Very few persons manure trees growing in soil or grass land in a judicious or economical manner. The general practice is to dig the manure in, within a diameter of six feet, having the body for the centre. The tree takes its food from the young rootlets, whose mouths extend just as far on every side, as the branches of the trees; hence, this manure applied close to the body of the tree, is not where the roots take it up; and, of course, but little of its value is absorbed by the tree. If you doubt it, just try the experiment on two trees. Serve the one as above named, and the other, as follows, viz:—Mark a circle around the tree, having for its outline the exact radius formed by the overhanging branches, dig on the inner side of this circle a trench two feet wide, and one foot deep; mix well-rotted manure half and half with the best of the soil, or the earth dug out of the trench, and fill the trench with it; then replace the turf, and wheel away the refuse, or extra earth, rake clean and smooth, you will have a good growth of tree, your fruit large and more fair, and no unsightly or unnatural hillock or mound around the body of the tree.

BUTTER MAKING.

"Can we make more Butter by churning all the Milk than the Cream only?"

Most assuredly we can. Almost every one who has had experience

in butter making in hot weather knows that before the cream all rises the milk will be loppered, and sometimes it is found mouldy. Now, in this case, are we to get all the butter that is in the milk, unless we churn milk, cream and all? One of my neighbors churns his milk and cream all together, and after the buttermilk has stood while he churns it over again, and finds enough butter in the buttermilk to supply his family with what they want to eat. If you could compel the cream to rise all up before the milk is loppered, you could then get nearly all the cream of the milk, so as to have the whole of the butter by churning the cream only.—A. L. SMITH in *Genesee Farmer*.

APPLES AS FOOD.

The working people in cities do not, as a general thing, regard apples as food, but merely as a luxury; this is especially the case with our foreign population. But apples are not estimated according to their real value as an article of food, they hold a low rank in the estimation of most persons in comparison with potatoes, so far as it relates to their nutritive qualities, whereas the best qualities of apples are perhaps superior. In Cornwall, England, the peasantry consider ripe mellow apples superior to potatoes as food, and nearly equal to wheaten bread. In many parts of Europe the laboring people eat sliced apples with their daily bread, and make a hearty, healthy meal of them. The finest apples in the world are raised in the United States, and the working people in our cities would do well to use more of them for food, especially during the fall and winter seasons, when they can be obtained cheap. We hope yet to be able to eat apples during the midst of summer (at fair and reasonable prices,) as sweet in flavor and rich in nutriment as when plucked from the tree. Much attention is now directed to their perfect preservation during the summer's heat and winter's cold.

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