The Educational Review.

Devoted to Advanced Methods of Education and General Culture.

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FRIDAY, 18th of May, has been selected as Arbor Day for New Brunswick schools.

THE next number of the REVIEW, which ends the first volume, will be issued about the 10th of May. Contributors to its colums will oblige us by handing in their favors as early as possible.

PROFESSOR ROBERTS of Kings College read before the Historical Society of Nova Scotia an extremely interesting paper on the "Aroostook War" between New Brunswick and the State of Maine in 1839. He has also thrown some new light on the Ashburton Treaty, which shows that New Brunswick and not the State of Maine gained the advantage in the division of the disputed territory.

Garden and Forest, a new weekly journal, devoted to horticulture in all its branches, landscape gardening, plant diseases, and insects injurious to vegetation, has made its appearance. With its talented corps of editors and contributors, it promises to be an admirable publication for the purposes in view. See the advertisement in another column for an enumeration of its many excellent features.

A PUBLIC meeting was held in Orpheus Hall, Halifax, on Friday evening, April 6th, under the auspices of the Frœbel Institute of Nova Scotia, for the purpose of bringing to the attention of the public the advantages of kindergarten instruction, especially in the cities and towns. W. C. Silver, Esq., presided, and opened the subject in a short address. He was followed by Mr. Lawrence, M. P. P., of Truro, Hon. Mr. Gillivray, M. P. P., Antigonish, Miss Woodcock, Principal of the Truro Kindergarten, Principal MacKay of Pictou, and Mrs. Condon, President of the Institute. Special reference was made to the superior Kindergarten of Truro. A room has been given it by the government in the normal school building. The institution is supported as yet principally by the people of Truro. The province receives benefit from it through an arrangement by which the normal school students visit it regularly, in relays of about a dozen at a time. Its principles will in this manner be introduced to some extent into the primary schools of the province. The subsidy promised for a quarter mile of railway would be a great boon to a central school of this kind in connection with the normal school; and would eventually benefit the whole country to a much greater extent than even a whole mile of some local railway.

SECONDARY EDUCATION.

In our last issue there was briefly outlined from the report of the New Brunswick schools, a plan for the establishment of five high schools for the promotion of secondary education in the province. In submitting the plan, Chief Superintendent Crocket expressed the hope that the Legislature, at its approaching session, might frame a bill in accordance with his suggestions, to become law on the first of January next. The Legislature has dispersed without taking any action in the matter. The additional outlay of about $6,000 per annum in the present straightened finances of the provinces may have been one source of reluctance on the part of the Legislature in dealing with the question. In the meantime, there is ample opportunity to examine into the proposed change in secondary education, which seeks to do away with the county grammar schools and establish in their stead five thoroughly equipped high schools at St. John, Fredericton, St. Stephen, Moncton, Newcastle.

In addition to the increased expenditure there are other important considerations to be taken into

account, when the province is asked to provide for a more efficient system of secondary education. Chief Superintendent Crocket well draws attention to the fact that our secondary school course "needs enlargement, and needs it chiefly on the scientific side." He would have a scientific course as ample as the classical in these schools. But why undertake, since the schools are to be established in sections and must necessarily draw pupils from distant homes, to have two "ample" courses under one roof? The curricula of these schools would be overburdened if the attempt were made to teach a classical as well as a broad scientific and English course. The extra expenditure required to maintain two such courses would not be justified by the results. Let the wants of the people in each high school section be the chief basis on which the curriculum of that school shall be framed.

The complaint of one of our superintendents, referred to in another column, that the school programme is in most cases adapted to the few who are preparing to enter the professions, is unfortunately too general and too well grounded. In framing a course of secondary education for the province, would it not be well to consider more the requirements of certain sections, and instead of having the same curriculum for each school, to modify the course so as to meet special needs? Let the Collegiate School, Fredericton, have a full classical course and be a feeder of the university, by shaping its curriculum to the *present* requirements for matriculation to the University of New Brunswick. In St. John it might be advisable to carry on the two courses—classical and scientific; but in any case there should in this city be ample provision made for carrying out a thorough modern course, embracing the requirements of a sound commercial education, with a more advanced course in science, English and modern languages. In the other sections let the curricula of the schools also be determined by the requirements of the people. Science with special reference to its bearing on agriculture and horticulture, should be taught with greater fulness, and the classics should give place in great part, to a thorough course in English, science and practical mathematics.

There is another feature of the proposal to establish the high schools that should be thoughtfully considered. They are to be located in wealthy districts where the inhabitants have already evinced a determination to provide a reasonably good system of secondary education. Under these circumstances it is a matter for consideration, whether a portion of the money to be drawn from the provincial treasury for the support of the proposed high schools could not be applied more advantageously in providing a grant for a provincial school of agriculture and a technical school. Such institutions are springing into vigorous growth on all sides.

These schools, if established on a small scale at first, and perhaps in connection with institutions already in existence, would prove of vast advantage by stimulating the study of useful subjects throughout our public schools. Their desirability and how they may be established without entailing any heavy pecuniary burden will best be considered in a future issue.

INTERPROVINCIAL CONVENTION.

The announcement in our last issue of the proposed gathering of teachers, next July, in the city of St. John, marks the commencement of a new era in the history of educational procedure in these provinces. Hitherto the work in this department has been prosecuted independently in each province, without reference to and but little knowledge of the principles which govern and the practice which prevails in the others. And yet there have been times when questions of a character far reaching and vital to the interests of sound education, have commanded attention outside the province in which they were being discussed, and secured the interest and sympathy of the intelligent observer. Nor is the reason difficult to discover. Each province has naturally taken its own course in the development of its material resources, but the elaboration of a system of education is a very different matter. Though there are here also a diversity of interests, and prejudices local and traditionary, yet the inhabitants of the three provinces have sprung from the same stock, they acknowledge the same parent nationalities, and they inherit the same solicitude for the education of their children, and therefore, however indifferent they may feel towards other concerns of their neighbors, they give evidence by the care with which they watch educational progress, that this is a subject of common and not of mere provincial interest. It should not then be a difficult matter to bring the teachers and others connected with educational work in these provinces, together in convention, to discuss questions of paramount importance to the profession and the country, and to endeavor to arrive at a practical solution of some of those problems which are not only proposed to the educationists of Canada, but have long been engrossing the attention of the most distinguished men in their profession in the United States, Great Britain and the continent of Europe.

Provincial conventions and county gatherings of teachers have been upon the whole successful. Some persons have, however, expressed grave doubts as to the practical benefit of these meetings, but we have not the least hesitation in expressing our conviction, that if they do nothing more than bring the teachers together, promote fraternal intercourse, and become the occasion for the renewal of friendship and the interchange of experiences, they are of great advantage. The teacher retires from such meetings, encouraged and strengthened for his work. He feels that he is not alone, but one of a band of co-workers engaged in the same noble profession, inspired with the same enthusiasm and actuated by the same

motives. And if such is the result from the more limited associations which assemble in county or province, what may we not look for from such a gathering as that at St. John?

When people meet for a common purpose, and when that is to help, animate and counsel one another, nothing contributes so much to success as the inspiring influence of numbers. Surely the teachers of New Brunswick, Nova Scotia, and Prince Edward Island have public spirit and professional pride in sufficient degree to ensure the presence of that element of success. They will have an admirable opportunity of discussing or hearing discussed subjects relating to educational administration and school procedure from the different standpoints of the three provinces. What more interesting topic can be discussed by the assembled teachers than the means by which a greater assimilation in methods and course of instruction can be reached? Teachers are at present educated, trained and certificated under the laws of each province—Why may not a common standard, a common license, and an interchange of teachers be one of the gratifying results of this convention? We know of scarcely any modification of the existing state of things which would serve more effectually to bring the provinces into hearty sympathy in the prosecution of educational enterprise, and infuse into the teachers a more healthy spirit of emulation and a brighter zeal.

We would say, then, to the teachers: Let the people see that you are alive to the importance of such a gathering as that contemplated, that you are possessed of the desire to stimulate each other by your presence, and express by force of numbers the influence which you must wield in the community, and convince the most sceptical by the wisdom and practical talent which you exhibit that you worthily occupy the positions of trust and honor in which you are placed.

That this Interprovincial Convention may be the means of creating a wider and deeper interest in true educational work in the community at large, may arouse the teachers to more sustained and more intelligent effort, be productive of wise legislation and more generous support, and elicit the enlightened sympathy and hearty co-operation of all sections of the people with the teachers, ought to be the desire of all who have the good of their country at heart.

AN "At Home" will be held at Dalhousie college on Thursday, April 26th. The interest attached to these gatherings in the past will be enhanced on this occasion by the fact the university will welcome its friends in more commodious and pleasant quarters.

ARBOR DAY.

Begin at once, if you have not already done so, to make arrangements for Arbor Day. Prepare—or, better, let the pupils do it—a plan of the school grounds; mark upon it where trees are to be set out, flower beds with the particular shape of each, what dead trees of previous plantings will have to be replaced. If a tree promises to be stunted or ill-formed or unthrifty, mark it for digging up in order to supply its place with a more vigorous one. No worse place could be selected for a group of ill-formed or stunted trees than a school ground. Clear away any refuse that may have collected during the fall and winter, and prepare it for burning. Clear away the mulching that has been used to protect the roots of the trees during winter. Ask some successful cultivator in the district about the quality and quantity of a fertilizer to be strewn about the tree—early so that the spring rains may carry nourishment into the ground and about the roots.

Begin early to get the children interested in the work. No better plan could be adopted than to have a lesson on natural history every day. A little change in the order of lessons in this respect will be productive of excellent results at a time of year when confinement in close rooms and the routine of regular work begin to be irksome. Use the outline of lessons on botany in this number of the REVIEW, adapting what may seem best suited for your class. Turn to back numbers of the REVIEW, and look over the "Ferndale School" lessons. Look out for those insects that appear early, and especially for indications of those that are harmful to trees and farmers. Incorporate these lessons on plants and insects for a time more with the regular school work by letting pupils draw and write about the subjects taken up for the day. Carry out these lessons with spirit and intelligence and Arbor Day will be a success: more, intelligent people in your neighborhood will realize that your work is useful.

Arrange early for a literary programme for Arbor Day, by making selections for recitations and songs, and assigning subjects for essays. The "Woods in Spring," "My Favorite Tree," "Famous Oak Trees of History," "Uses of Various Trees," the maple, oak, beech, pine, etc., "How to Care for Trees," and other subjects, may be selected. If there are any trees in the neighborhood or province about which any historic associations cluster, these may form the subjects of essays. In next issue further hints will be given for the observance of the day.

SUMMER SCHOOLS.

On another page of the REVIEW will be found the programme of the Nova Scotian Summer School of Science for this year. The staff of instructors is a competent one, and the work outlined of a practical and comprehensive character. Over forty teachers attended the school last year. Its promoters look forward with confidence to a decided increase this year both in numbers and interest.

The arrangements for holding a Summer School in New Brunswick are not yet completed, but they are sufficiently advanced to enable us to state that the School will meet in St. John, probably during the first week in July. A circular is being prepared, giving the limits of the course of study to be pursued, an estimate of expenses of members while attending, with the names of instructors in the different departments. This circular will be issued with the next number of the REVIEW.

The Summer School involves some sacrifice on the part not only of the instructors, but also of students; but we feel assured that those who make the sacrifice are greatly benefited. The laboratory work alternates with excursions to the seashore and other places of interest to the student, so that the time goes all too quickly, and the stimulus imparted quickens both the mental and physical pulse. We think no one will question that the teacher who spends at least a portion of his vacation in some inviting field of research, one that takes him into the open air, is much better equipped, both physically and mentally, for his year's work, than the one who aimlessly wanders about without any fixed purpose, or in the "rest" that is gained by entire absence from any occupation. If natural history is to be taught successfully in our schools, it can only be done through communion with and study of nature; and when can the foundation for this successful teaching be laid more leisurely than in summer, and where more pleasantly and profitably than at the Summer School?

ENGLISH LITERATURE.

If the attention which is devoted to this subject in the advanced classes of our high schools and colleges may be taken as evidence of the existence of a desire to become acquainted with the history of our literature, and of a laudable effort to gratify it, we are justified in acknowledging the presence of both. English literature is prominent in advertisements of the curricula of public and private schools. It is the pet subject to be presented on special occasions, such as public exhibitions or the advent of a distinguished visitor, when the marvellous familiarity exhibited by particular pupils with the characteristics and influence of our great writers calls forth the admiration and rapture of the listeners. At such times one cannot help observing that if the study is not successfully prosecuted, it is not owing to any want of effort on the part of the teacher, or of assiduous application on that of the scholar.

Nor are the means at the command of the teacher limited or inferior. The number of works, large and small, elaborate treatises and elementary text-books, intended to aid him in his labors, is simply prodigious. Not a year passes but books, booklets, primers, handbooks, charts and annotated editions are published to facilitate the labors of both teacher and student. And many of these are of distinguished excellence. They are not the productions of book-makers, but of the most eminent literary men of the day. The names of Arnold, Stephen, Chambers, Morley, Masson and Taine, are sufficient warrant for the character of their works.

But the question is forced upon us, and in such a manner that it cannot be evaded:—Is English literature, as it is generally taught, productive of permanent benefit? Is the knowledge contained in text-books, in the way in which it is most frequently acquired, of positive value to the student, or, from an educational point of view, is it an instrument of culture? Does the ability to name the principal English writers in prose or verse, to narrate the incidents of their lives, or repeat, after the class-book or lecture, a criticism of the work and the reasons for their place in the history of English literature, cultivate the intellect or elevate the taste? Does a course of instruction in this subject, as it is most frequently presented at the present time, appeal to or exercise any faculty of the mind but the memory? We fear that these questions admit only of an answer in the negative. Such instruction, as final, in this department of knowledge, is in most cases evanescent, and even where part of it is retained in the memory, the acquisition is of little value. We fail to observe, under this mode of procedure, any brightening of the critical faculty, any assimilation of knowledge or even an awakening of the curiosity.

We remember reading, some years ago, of the visit made to a normal school by a distinguished nobleman, high in office, and eminent as a man of letters. The class of young ladies that was called up for recitation, to present to his lordship a specimen of the work of the institution, and, perhaps, out of compliment to his literary fame, was examined in English literature. The questions were such as would

be set in an examination paper, where time is at command and the nerves in repose. But the lady-students, in response to the questioner, poured forth in elegant language, criticisms of poems, biographies of poets, and essays on the development of the English language. They were rewarded by the applause of the listeners, and in a more marked degree by his lordship, who deplored the wretched condition of literary knowledge in his own country, as compared with that indicated by the exhibition which he had just witnessed. And yet it was nothing but a well ordered and carefully prepared performance. The students had been taught to commit to memory, and the answers were word for word in the language of the manual. No appeal was made to the judgment, taste, power of analysis, or even to their ability to express themselves in their own language. The exercise was barren but showy, to the unsuspecting a marvel, but to the initiated a sham.

This may be an extreme instance, but we fear that the study of English literature, as generally pursued, is not more profitable. It may, indeed, be necessary, and, perhaps, it is all that can be accomplished by boys and girls in the senior classes in our high schools, to confine the course in English literature to the names and works of our leading authors. But this might, without difficulty, be supplemented by biographical notices communicated in an attractive form by the teacher. And since every senior reader supplies selections from the works of our best authors, there need be no lack of excellent materials for illustration. Those especially who use the sixth reader of Gage's Educational Course, have an admirable series of extracts from the leading writers on both sides of the Atlantic, which, if judiciously managed, cannot fail in the hands of a cultured teacher to attract the sympathy and arouse the interest of his more promising pupils.

One of the best hand-books that we know of for beginners in the study of English literature is the primer by Mr. Stopford Brooks. It gives a clear, concise and intelligent idea of the principal works in the language, their authors, their place in our literature, the influence they had upon the time in which they lived, and upon the writers who succeeded them. But even this book, valuable compend as it is, will do little towards the culture of pupils, unless it be accompanied by selections from the authors whose works are revised. Nor can the teacher so effectually communicate a precise and impressive notion of the growth of our language, as by reading extracts from the authors selected to illustrate that development. At this stage, criticism is beyond the powers of the pupil, and all that the teacher can expect is a bare repetition of the opinions which the pupil has read or listened to. But he ought to call for a digest or abstract of the work or part of the work which has been read to him, and surely there is no better exercise in composition than this can be made.

But this presupposes that the teachers themselves are cultured men and women, that they not only know the facts of our literature, but understand and sympathize with its masterpieces. How otherwise can they induce their pupils to read and think, unless they read and think for themselves? If they have felt no love or appreciation of literature, how can they awaken these feelings in the minds of others? If they have not drunk deeply from the wells of our literature, how can they imagine that they will be able to lead others to these fountains and persuade them to drink? We would say, therefore, let our teachers be constant and thoughtful readers of our best literature, and they will not only extend and correct their views of men and of the world, gain deeper and truer conceptions of their own nature, but wield a beneficent influence on the minds of those who have been entrusted to their care and guidance.

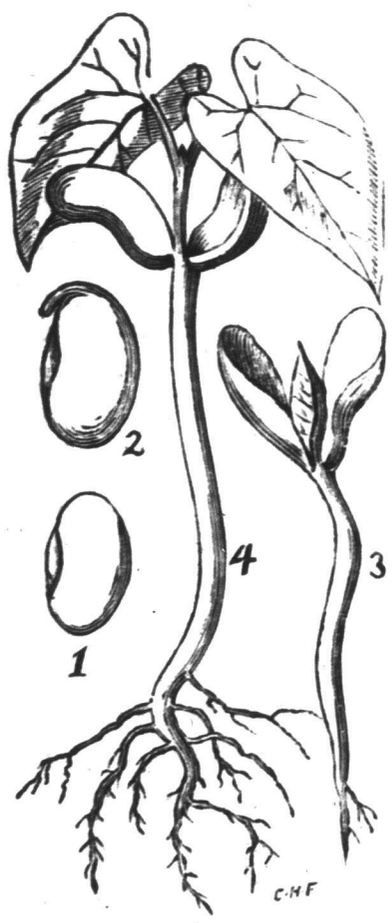
And what more satisfactory result can be gained from the study of literature than that the pupil leave school or college with an avidity for reading? If the teacher has aroused this desire and directed it to worthy objects; if he has, moreover, trained the mind to observe, reflect and discriminate, he has performed a signal service, a service infinitely more valuable than if he had drilled and ground and crammed into his pupil's head the whole circle of the sciences. The pleasure and profit to be derived from the habit thus acquired is unbounded, and the career of self-instruction is begun under circumstances of singular advantage. A small proportion of our youth proceeds to the university, so that most of the preparatory training for the business of life is obtained within the limits of the resources of the school systems of these provinces. How necessary therefore, that our high schools should not only be so equipped as to prepare our youth for the duties before them, but to bring them somewhat nearer to the perfection of their nature! It is right to fit out our youth with the mental implements which they will require in their several careers, but it is not less indispensable for us, on their account as well as our own, to avail ourselves of every instrument by which our common nature may be strengthened, exalted, purified and beautified. And of all the agencies at our command, we cannot conceive one more impressive or inspiring to young and ardent souls than the reading and instruction of a cultured and enthusiastic teacher from the pages of Shakespeare or Milton, Scott or Tennyson.

PRACTICAL BOTANY.

No. I. Growth from the Seed.

When a flower is planted and reared, dissected and classified, and sketched in its natural tints, it is known, as it never is known to a mere memorizer of botanical text-books. —*Popular Science Monthly for March*, p. 699.

Ask your pupils to plant half a dozen seeds of the common bean. This may be done in a common flower-pot—filling it with dry earth, finely powdered, or sand. Make two circles in the earth to the depth of about half an inch. Plant half a dozen beans in the outer semi-circle and two or three days after complete the circle. Plant in the inner circle likewise, allowing two or three days between each planting. Be careful to keep the earth moist with tepid water, sprinkling it twice a day, and keep a piece of glass over the flower-pot to retain the moisture. The temperature should be that of an ordinary living room —between 65° and 70°. If the boxes are kept during the day in a sunny window, growth will be more rapid. *In no case* should the teacher do more than give full and explicit directions to the pupil. Let the work and attention to the growing plants devolve entirely upon him, being careful to impress on his mind the necessity of an even temperature and sufficient, but not too abundant, moisture. About a week after the plantation has been commenced, two or three seeds of the bean may be started between the folds of thick paper or cloth, kept warm and damp, but allowing a circulation of air. (This will serve as an illustration that plants may grow for a time, at least, without being set in the earth).



In about ten days, or perhaps less, everything should be in readiness for the lesson —"Growth from the Seed." Let each pupil have a series before him, consisting of, first, a bean that has been soaked in water for the past twenty-four hours; second, one that has been growing for two or three days between the folds of paper,—and so on with the others in the order of growth as shown in the diagram. Allow time for careful examination of specimens; question judiciously, and be careful to proceed slowly and take one thing at a time. The order may be as follows: After the covering is separated from the seed that has been soaked in water, it is noticed that there are two halves. Ask the pupil to observe these parts in the next two or three of the series before him and the changes that take place. Is there any change of form? of color? loss of substance? What has become of the material laid up in the two plump parts of the seed? In this way the pupil may be led to see what purpose these parts serve. Show that this stock of food—an abundant one in the case of the bean or pea—was laid up the previous season by the parent, to support the young plant in the early stages of its growth. Show how man appropriates this nourishment for himself. (Ask the pupils to collect for another lesson the seeds of apple, wheat, corn, oats, etc., to show this store of food laid up. Get them to cultivate these in the same manner as the bean, and notice that the store of food is differently arranged). These two parts are called seed-leaves—*cotyledons*; write the name on the board. It is necessary to learn it. Notice the dwindling in size of the cotyledons, and the greenish hue they assume in the plants of advanced growth. Notice the second pair of leaves in No. 4 in the cut. Perhaps some of the plants are sufficiently advanced to show a third pair of leaves. If so, notice the similarity existing between these two pairs, and how they differ from the first.

Turn again to the seed bean. What is the little cone-like body between the cotyledons? Notice in the seed that has been soaked for twenty-four hours that it has curved and lengthened. What do you notice between the cotyledons, so delicately folded up? Trace throughout the series. Show that this cone-like body pushes one end upward to the light and air (the ascending axis or stem) and that leaves are borne on it; that as these gradually expand—one on each side—the stem steadily pushes upward, continually sending out new leaves; that the part of the stem where they appear is called a node (Is there any connection between node and knot?); and that the part of the stem between the nodes is called an inter-node or "plant-part." Show that the plant hastens to expose as much surface to the light and air as possible. Why?

Return to the seed. One end of the cone-like body, it will be observed by comparing the plants of the series, is just as anxious to escape the light and air, and bends in an opposite direction. What do you notice appearing from this end? Was there any sign of these little roots in the seed? Convey the idea that the roots are *developed* from one end of the rudimentary axis, and that root-hairs grow from these roots. Get the pupils to look closely for these and show that their great number is to enable the plant

to present all the surface possible below ground. Why? (Older pupils may be questioned more fully on what constitutes the food of plants and how they take it up).

Ask pupils to collect the little plants of maples, beeches and others, growing in hardwood groves, and which may be easily detected, peering out from beneath last year's fallen leaves, especially on a sunny hillside. Let them contrast these with the plants they have cultivated. Encourage them to search. Enter upon the work with enthusiasm. Let the pupils make drawings of the different plants studied, and of the same plant in different stages of growth. Let them write about what they have found out and they will express themselves clearly and well, if they have not been told what they ought to have seen for themselves, after careful questioning.

No. II. Early Flowers.

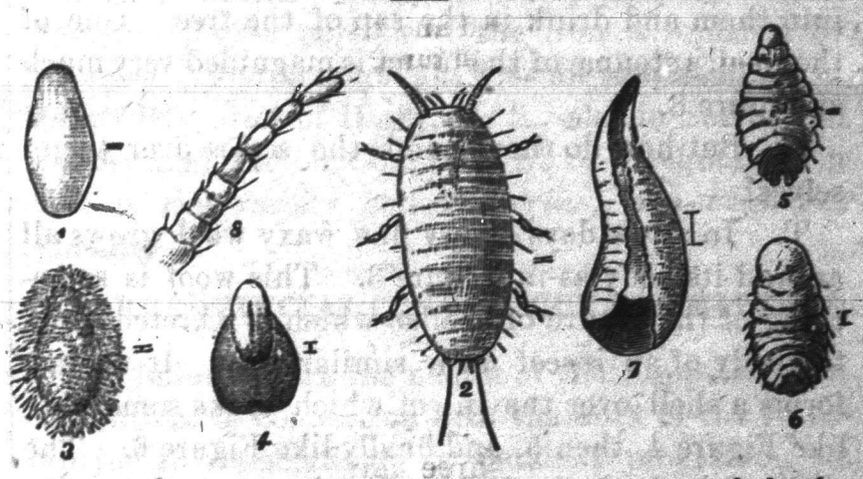
While the pupils are engaged in cultivating the plants referred to in No. I., they may be encouraged to look for those early flowers (catkins) that appear upon the willow, alder, birch, hazel and other trees and shrubs before the leaves appear. They may be found, especially on the willows, as early as the first week in April, and continue for several weeks; so that by the time the Review comes to hand, there will be abundance of material for plant lessons. The flowers are a little difficult for beginners but attention may be drawn to them, their characteristics as flowers observed, and sketches made of them. Older pupils may investigate further and find out the composition of the flower. The figure represents a branch of *Corylus rostrata* (hazel-nut). The drooping aments or catkins at *a* contain the staminate flowers; a bract showing the stamen with its short filament adhering is seen at *b;* the inconspicuous pistillate flowers are shown at *c*, with one at *d* enlarged. The staminate and pistillate flowers in the Corylus grow on the same plant — hence called monœcious (growing in one household). In others, as the willow, the staminate and pistillate flowers grow on separate trees; hence they are called dicœcious (growing in two households).

On the common alder the staminate and pistillate flowers (calkins) are arranged in nearly the same way as in the above illustration. Collect also the flowers of the oak, birch, beech, hornbeam, sweet fern, *(myrica asplenifolia)*, and poplar. Distinguish staminate from pistillate flowers. Are the plants monœcious or dicœcious?

FERNDALE SCHOOL.

No. XI.—The Oyster-Shell Bark Louse.

(*Mytilaspis pomorum.* Bouché).



Teacher. I have here a piece of the smooth bark of a young apple tree, very thickly covered over with small oyster-shell shaped scales about the eighth part of an inch in length. I cut off a piece of the most densely covered, exactly one inch square. Please count the number of scales on it.

S. About 200.

T. Very good. I now scrape off one of them carefully with my pen-knife, turn it upside down and examine it with the microscope. It looks like Figure 7 above. Examine, and tell what you see.

S. It looks something like a curved canoe, broader at one end, and nearly all filled up with beautiful white potatoes shaped like Figure 1 above, only so small that there must be twenty or thirty of them in the broader part of the canoe.

T. Correct. These are the eggs of the insect which has shrivelled up to a very small speck at the narrow end of the scales. Some of these scales are more than a year old and empty. Supposing one half of them to be filled with eggs, how many eggs are there on this square inch of bark?

Scholars. One hundred multiplied by thirty—three thousand.

T. Yes; at the very least there are three thousand. And about the end of May and the first of June the warm sun will hatch these eggs, and from under these scales will come myriads of small lice like Figure 2 above, but so small that you can hardly see them with the unaided eye. Notice the two fine lines on the right side of the figure. The distance between these two lines is the real length. These small marks are put beside each figure to show its real size when not magnified.

S. That is why our gardener paints the trees about the first of June with soft soap, diluted with a strong solution of washing soda, I suppose.

T. That is quite the proper thing, for it will be sure to kill them at this tender and unprotected age.

But if they are allowed their own way they wander about in great numbers to the base of the smooth barked young twigs and insert their sharp tiny beaks into them and drink in the sap of the tree. One of the small antennæ of the insect is magnified very much at Figure 8.

S. But how do they build the scales over themselves?

T. In a few days a very fine waxy wool grows all around its body as in Figure 3. This wool is something of the nature of shellac which is secreted from the body of an insect in a similar way. It at last forms a shell over the insect which looks something like Figure 4, then 5, and finally like Figure 6. The shell sticks to the bark with the insect underneath. In August it commences to lay its eggs under the broad part of the shell, which grows in the direction of the narrow part, pushing the insect, as it were, before it, until sometimes as many as a hundred eggs have been found under the body of the scale, with the dried up remains of the insect itself, compressed into the extreme narrow end. The eggs remain protected under this covering through the winter until next spring.

S. Are they hurtful to the trees?

T. When numerous they are very injurious, and if not prevented, in June they can spread from one tree to another easily and are sometimes found on the pear, the plum and the currant bush. How would you destroy them?

S. With the soap and washing soda solution in June.

S. I would scrap them off in autumn or winter, so that their eggs would be destroyed by the wet and the frost.

T. Very good. But I should tell you that the male insect which is very small, has also a tiny pair of wings, and that they are nearly related to the visible plant lice, and therefore belong to the order *Hemiptera*.

THE Halifax *Critic* says: Mr. F. Blake Crofton's second paper on "Haliburton, Thinker and Writer," was admirably read on a recent evening before the N. S. Historical Society by Mr. S. Harrington, Sir Adams Archibald in the Chair. Those who were unable to attend missed a high intellectual treat. It would be impossible in any space we can command to do justice to it, but we earnestly hope that both lectures may be put before the public in some form accessible to all, for it is certain that no reading Nova Scotian ought to be ignorant of what has been so admirably done by Mr. Crofton for the reputation of Nova Scotia's greatest writer and almost prophetic thinker.

AMONG THE CONSTELLATIONS.

No. VII. — SOUTH-WESTERN CONSTELLATIONS OF APRIL EVENINGS.

"There they stand
Shining in order, like a living hymn
Written in light."

—*N. P. Willis.*

Late in the evening Taurus will be setting north of the west point of the horizon. Notice, that the whole heavens seem to describe a circular path around the North Pole Star as a centre. The Milky Way runs diagonally through this field—from between Perseus and Auriga right through the faint-starred Monoceros. Auriga, the charioteer, is not far from the zenith. Alpha of the first magnitude is called Capella. Alpha of Taurus was called by the Arabians Aldebaran (accent on second syllable). The Pleiades are well to the west, while Beta of Taurus, called Nath, in the tip of one of the Bull's horns, is near the Milky Way. Alpha of Orion is known as Betelguese, Beta as Rigel and Gamma as Bellatrix. The rhymster's directions can now be followed:

"From Rigel rise, and lead a line through Bellatrix's light,
Pass Nath upon the Bull's north horn, and gain Capella's height—
Where a large triangle is formed, isosceles it seems,
When Beta is with Delta joined to lustrous Alpha's beams."

Alpha of Canis Major is the brightest star in the heavens, also called the Dog Star as mentioned in our previous number. Alpha of Canis Minor is called Procyon, which means in Greek, the "forerunner of the dog," alluding to its appearing on the horizon shortly before the appearance of Sirius. A line through Gamma and Alpha of Orion eastward will pass above Procyon and its lonely companion Beta of the third magnitude. Right above these twin stars are Castor and Pollux in Gemini. Castor is the northern one, Alpha; Pollux is Beta.

Taurus, Gemini and Cancer are three signs of the Zodiac. The sun's path each year lies through them. About May 19th the sun will be below the Pleiades; about June 1st, above Alpha Tauri (Aldebaran); about June 10th, below Beta (Nath); about July 10th, below Castor and Pollux in Gemini, and towards the end of the month in Cancer. Next month we shall look in the same manner at the constellations in the south-eastern sky in the early part of the evening.

[NOTE.—We regret that a star-map, intended to accompany this article, could not be prepared in time].

The Planets in April.

Mars and Uranus are in the constellation Virgo which will be directly south near 11 p. m. The former is bright and ruddy approaching Spica, the star of the first magnitude in the constellation. Uranus is scarcely visible except through a telescope. The ecliptic passes only a few degrees above Spica, which the sun will pass about the middle of October.

Jupiter is in Scorpio further to the east and will not south until about 2 a. m.

Saturn is in Cancer east of Pollux and Procyon.

Neptune is in Taurus.

Venus and Mercury are in Aquarius southing between 10 and 11 a. m., and are visible just before sunrise.

The Comet.

Sawerthal's comet is also in Aquarius, not far from the neighborhood of these planets. It has come from the south where it was first visible and is passing from Aquarius northerly into Pegasus. It is now becoming invisible to the naked eye.

Sun Dog.

On Friday, March 16th, at 4 p. m., Pictou, a very brilliant sun dog, as brightly colored as a rainbow, appeared in the deep blue colored sky above it. Measured by a sextant it was about 46° above the sun to which it was convex. It was at least 30° of arc in length forming apparently a portion of circle around a point near the zenith. Before the measurements were completed a light cirrus cloud grew out of the blue and the bow become faint and rapidly disappeared.

FERNDALE NOTES.

III.—Minerals Containing Iron.

1. *Pyrite,* FeS_2 (Iron bisulphide, Fool's Gold). Yellow. Harder than a knife-blade. When heated gives off sulphur. Sulphate of iron (green vitriol or copperas) and sulphuric acid (oil of vitriol) manufactured from it, but not in Atlantic Provinces. Very abundant.

2. *Marcasite.* A variety of pyrite, but nearly white. A fine specimen seen from Cumberland Co., N. S. Rare.

3. *Arsenopyrite,* FeAsS (Mispickel, Arsenical Iron Pyrites). White. Softer than pyrite. When heated red hot gives off white arsenical fumes with an odor of garlic. Abundant in the gold-bearing rocks of Nova Scotia. A profitable source of arsenic if utilized.

4. *Chalcopyrite,* $CuFeS_2$ (Copper Pyrites, Copper and Iron Sulphide). Yellower than pyrite and softer. Differs from gold in crumbling before the edge of the knife, which easily marks it. A copper ore. Widely disseminated in Nova Scotia, Cape Breton, and New Brunswick.

5. *Menaccanite.* (Titaniferous iron ore). Like Hematite, but a portion of the iron is replaced by *titanium.* Found abundantly as an iron sand at St. Mary's Bay, west of Digby, N. S., also in Shelburne, Halifax and Pictou Counties, N. S. Magnetic iron sand is the variety called *iserine;* non-magnetic, *ilmenite.*

INTERPROVINCIAL CONVENTION COMMITTEES.

The following are the names of those appointed on committees in connection with the work of the Interprovincial Association. A detailed programme of this work will be published in the May or June number of the Review. In the meantime, teachers in the different provinces will confer a favor by communicating any suggestions they may have in regard to the work of each section, to any member of the committee belonging to such section.

General Committee.

Supt. Montgomery, P. E. I.; F. H. Eaton, N. S.; Eldon Mullin, N. B.

Committees for Sections.

New Brunswick.

(A). *Normal School.*—Principal Eldon Mullin, Fredericton.

(B). *Inspectoral.*—Inspectors Oakes, Canterbury, York Co.; Wetmore, Clifton, Kings; Mersereau, Newcastle, N. B.

(C). *High School.*—Philip Cox, Newcastle; Wm. M. McLean, St. John; S. C. Wilbur, Moncton.

(D). *Common School.*—H. Town, St. John; W. T. Kerr, Woodstock; S. W. Irons, Moncton.

(E). *Primary School.*—Annie M. Harvey, Fredericton; Grace Murphy, Portland; Jennie Lyle, St. Stephen.

Nova Scotia.

(A). Principal J. B. Calkin, Truro.

(B). Inspectors H. Condon, Halifax; C. E. Roscoe, Wolfville; A. G. McDonald, Antigonish.

(C). A. H. MacKay, Pictou; A. Cameron, Yarmouth; H. H. McIntosh, Lunenburg.

(D). Messrs. W. T. Kennedy, Halifax; A. D. Brown, Bridgetown; W. R. Slade, Oxford.

(E). Miss A. Lewis, Truro; Miss Sullivan, Halifax; Miss McGregor, Amherst.

Prince Edward Island.

(A). Principal Anderson, Charlottetown.

(B). Inspectors Arbuckle, Summerside; Cain, New Perth; McSwain, Charlottetown.

(C). Neil McLeod, Summerside; John A. Matheson, Kensington; John P. Wickham, Charlottetown.

(D). Allan C. Stewart, Stanley; Geo. E. Robinson, Charlottetown; John C. McEachern, Nine Mile Creek.

(E). Maria Lawson, Charlottetown; Jeanetta McPhail, Summerside; Helen Mitchell, Charlottetown.

Committee on Local Arrangements.

John March, F. H. Hayes, W. S. Carter, G. U. Hay, St. John.

For the REVIEW.]

SCHOOL SAVINGS BANKS.

I notice in a recent number of the EDUCATIONAL REVIEW a valuable extract from the Newcastle, N.B., *Advocate*, on School Savings Banks. As their establishment is something of an experiment in this country, it may interest your readers to know how the Dartmouth Bank is succeeding, as well as to know whether the criticism which was referred to in the extract is correct or not.

The Bank here has been in operation eleven weeks—a short time, but sufficient to form an opinion on many points. First, let me remark that the scheme was not advertised or lauded by any one connected with it so that it would have a big "send-off" in starting. The whole matter was conducted quietly, and in many rooms the scheme was simply spoken of *once* previous to opening the Bank, just sufficient to explain its objects and its working. I give you a list of each week's deposits; no exception is made for stormy days or any other such matter, hence some weeks are small, owing to bad weather and to the necessity of having attended four days in the week in order to bank.

The first banking day was December 9th, when $50.22 was deposited. The rest are $43.33; $43.68; $74.47, first banking after holidays; $42.82; $36.09; $50.88; $52.93; $32.04; $51.25; $47.33. As you are aware the months of January and February are the hardest months in the year to get cash.

We now have 601 depositors out of about 875 pupils enrolled. Average amount to credit of each depositor 87 cents; highest amount deposited by any pupil $14. A very large number deposit very small sums—from one to ten cents. This I consider a strong argument in their favor. The amount of withdrawals to date is only $2.19. As far as inquiry goes, I am able to state that many boys and girls are made more industrious through its working, as deposits of a pupil's *own savings* are encouraged, not deposits given by parents. Many, of course, are too young to earn, and do deposit sums given them; but many of the older ones deposit their own earnings instead of spending them foolishly.

As to the chief argument advanced by the teachers of Northumberland County against the scheme, *i. e.*, that it would place the children of poor parentage in a bad position as compared with those of rich parentage, I can say after careful enquiry and examination of the books, that such is not the case. In fact the largest deposits in many cases are made by those from whom we would least expect it. Active boys, who are willing to earn a few cents on opportunity, have the largest accounts as a class. The criticism that it will put class against class, or in any way wound the feelings of the child whose parents are not as well supplied with this world's goods as another, does not hold at all. Some from whom we would expect large deposits, come up with two to ten cents, while a poorer neighbor will have twenty-five cents. Our deposits are slowly growing, when we take into consideration the fact that the attendance has been bad owing to severe weather.

Our experience has led us to believe that School Savings Banks must be productive of good in Canada. The sound, practical training they impart in saving and self-restraint as well as the industrious habits fostered, not to consider the sum of money saved, must have a good effect on the youth of our towns where the chief object seems to be to get money to *spend*. When our experiment is tried out a few more months we shall expect all towns of any size and energy to adopt the system, and there can be no doubt as to the good they are capable of doing. In the old world that has been proved. School Savings Banks have come to stay. The battle is with the strong, and he is strong who can point to a cash surplus; still stronger is he who has the power within himself to create that surplus. School Savings Banks are an important factor in giving that power.

F. S. CONGDON.

Dartmouth, N. S.

For the REVIEW.]

HINTS TO PRIMARY TEACHERS.

A primary teacher should make the children she has to teach a study. To study children is of never-ending interest, as each child presents some new phase in its disposition; and no teacher will succeed unless she knows enough of that child's disposition to lay any subject before it so as to make it pleasing. One of the things to make a primary school successful is variety. Not constantly changing, so as not to give a child time to grasp one idea before it is hurried to another, but connecting one study with the other, or carrying the same idea through both. Children often get a dislike for study by being put through a regular routine distasteful to them. What child does not like change?

Cultivate the senses. What are a child's eyes for but to use? and how many children are not taught to use them? Have you never heard grown persons mourn because they did not notice objects at a glance?

Some persons will go through some particular place once and be able to tell you more about that place than one who has been through the place several times. What is the difference? One has cultivated

the sense of sight and the other has not. Teach a child to notice the objects it passes in going to and from school, and afterwards tell what it has seen.

A short time ago I gave some lessons on quartz, and in a few days I had a number of good specimens from the neighboring fields brought in by some of the smallest pupils of the school.

Did you ever see a child who did not like to handle things? It is quite natural that it should. Every child likes to see and feel any object it is being taught about. In giving an object lesson, do not take some vague subject, but take some object that will interest as well as instruct a child. Let it have the object in its hands, and examine it while the teacher explains and shows it the different points to be noticed.

Do not keep a child restrained. Let it be free to talk and act naturally. Do not mistake. Have good order; but you can have good order and not force it from children by harsh methods, but by a gentle firmness needful in governing children, which will not restrain them. No child can become interested in any subject when its mind partly is taken up by being kept in some unnatural position.

Teach drawing. It cultivates accuracy in sight and proportion and firmness of hand. It can be taught before writing, and in so doing the pupils will be better prepared to form the letters and have more control of the hand. Perhaps you will say, "Where will time come from for reading and arithmetic?" There will be plenty of time for them. Let that old-fashioned idea go, of teaching nothing to children but reading and arithmetic. Be a growing teacher and keep up with the age. A child will have use for other things besides reading and arithmetic in future years. We teachers are preparing them to battle with life. How careful we should be not to make study distasteful to children.

A primary teacher should be one of the best educated and most experienced of all teachers in order to answer the many questions of a child just beginning to think. And we should be so cautious not to answer in any way to give a wrong impression, for it seems almost impossible to get a wrong idea out of a child's mind. We are teachers under God, laying the foundations of the men and women who are to rule and influence the nation in after years. W. B. P.

Hebron, N. S.

It is the opinion of some recent psychologists, that memory is an attribute of the mind, like attention, not a faculty. If this is so, memory cannot be cultivated directly, only indirectly, through the faculties.

For the Review.]

ARBOR DAY.

Of late years a rapidly growing interest in tree culture has been manifested. The importance of the subject has long been recognized in the old countries of Europe, in several of which the state has taken it up, and by systematic planting has sought to supply the waste of the forest, caused by the continuous demand for timber. In the United States agriculture is pursued, not only with the object of replacing destroyed forests, but with the further purpose of affecting the climatic conditions of some sections of the country.

In Ontario and Quebec the same question has been pressing itself upon the public. Now, in those provinces immense numbers of trees are yearly planted and an Arbor Day observed. The agency of the schools has been called in to assist in this work, with the two-fold object of planting and so beautifying the roadsides and school grounds, and of imparting a useful branch of knowledge to the children, who, being early trained in arboriculture, are pretty sure in future years to continue the work and so add to the wealth of the land. This training further teaches them to prevent the needless destruction of woods, which in the past has caused enormous injury to the provinces. In our Northwest, strenuous efforts to the same end are being made. In these Maritime Provinces there is ample room for similar work. Some of our towns are bare, bleak and dusty, owing to absence of foliage from the streets, while others, of which Fredericton is a good illustration, are rendered beautiful and pleasant by their magnificent trees.

In Charlottetown, for many years no effort was made at improvement in this direction. The town is well situated and planned, but its broad streets were dirty and dusty, scarcely a leaf to be seen. Its principal square was an eyesore of old paper, brick-bats, decayed grass and refuse of divers kinds. In 1884, an organized effort was made to improve upon this state of things, and the Queen's birthday that year made Arbor Day and proclaimed a public holiday. The children from the public schools, to the number of 1,200 to 1,500, marched in procession to the square where addresses were delivered, and then the work of planting began. Several hundred trees were put out on the squares and streets by citizens, and last summer in their fourth season these trees had grown greatly, and had much improved the appearance of the place. Each year since then further planting has been done, though not nearly so much as was needed, until some 800 to 1,000 trees have been planted out in different

parts of the city. During the same period, Queen Square has been transformed from its ugliness into beautiful ornamental gardens.

In the country parts of P. E. Island little has yet been done, though three years ago the teachers and children in some of the public schools, at the instance of the Superintendent of Education, began to plant trees about the play-grounds. This is a most desirable movement. The writer well remembers, when a child attending a country school, the bare school-house of one room, cheerless inside and bare without. There were no trees near, save a few stunted spruce, and this on a spot where the elm or maple had only to be planted to grow luxuriantly in the rich virgin soil. The movement now begun should be carried on. Every teacher should consider it a part of his duty to promote it. The children will take a delighted interest in their trees if he shows them how to plant. It is yet too soon to see the good results of the work already done, sufficient time not having yet elapsed for much growth to be made, but very few years will show a good return, and the time spent by children and teachers in procuring and setting out the trees was not the least pleasant of their holidays.

Would it not be well to institute an Arbor Day for the schools throughout all the Maritime Provinces? Parents equally with their children might be expected to take an interest in it. The provinces would be gainers by every tree planted; the children would insensibly acquire information which would afford them future profit as well as pleasure. It might be impracticable to have the same day in all three of these provinces, as the date would necessarily be determined largely in each year by the time at which the spring opened, yet the same day would merely be adapted to the conditions of the whole of any one province. Each year the results could be made known by correspondence between teaching bodies or through the columns of educational or other journals, and might well find place in the reports of the several departments of education.

A. B. W.

Charlottetown, P. E. I.

APRIL.

April is here!
There 's a song in the maple, thrilling and new;
There's a flash of wings of the heavens' own hue;
There's a veil of green on the nearer hills;
There's a burst of rapture in woodland rills;
There are stars in the meadow dropped here and there;
There's a breath of arbutus in the air;
There's a dash of rain, as it flung in jest;
There's an arch of color spanning the west;
April is here!

—*Emma C. Dowd, in St. Nicholas for April.*

For the Review.]

FOUR NOTABLE REPORTS.

Four Kindergarten reports lie before us. That from Philadelphia, issued last year, contains an account of the transfer, by the Sub-primary Society, of thirty-two free Kindergartens to the school-board of that city. Miss Anna C. Hallowell, who, in 1879, stimulated by the generous example of Mrs. Pauline A. Shaw of Boston, founded free Kintergarten No. I., has ever since devoted herself to the work, and goes with her Kindergarten, in their new departure, as a member of the city school-board.

Boston Report of Examinations.

This contains answers from nearly 200 primary teachers to questions, propounded by the authorities as to the value of kindergarten training preparatory to the school. Putting together favorable and unfavorable opinions, (some of the latter from *hearsay only*), the verdict stands seven to one in favor of the kindergarten, as an *underpinning* to the school. The points of agreement were as follows: The children were more amenable to discipline and better able to settle down without delay to the orderly work of the school; the training of the senses had made them more observing and accurate; they had a fund of general information; they had an unusual command of language, therefore they learned to read quickly; their knowledge of form and constant dealing with numbers gave them an advantage in drawing, writing, and arithmetic; their manipulation of material in the "gifts" and "occupations," made them neat-handed; they were truthful, kindly, desirous of pleasing, and interested in their work.

The City of Boston has accepted the offer of Mrs. Shaw's free Kindergarten, so long supported by her munificence. She has not thrown upon them the burden of a costly and doubtful experiment, but has handed over an organized success, and a splendid addition to the public school system. The grant of $20,000 for their maintenance during the current year, is a tangible expression of gratitude to the noble daughter of Agassiz for her princely gift.

Report of the "Golden Gate" Kindergarten Association, San Francisco.

This association was organized Oct. 6th, 1879, when the second free Kindergarten in California was opened in Jackson street, a wretched place, on what is known as the Barbary Coast.

Mrs. Sarah B. Cooper, the superintendent, with Mrs. Leland Stanford, the honorary president, are the principal actors in the wonderful kindergarten movement which is transforming some of the worst parts of San Francisco. Ten years ago there was not one free kindergarten west of the Rocky Mountains.

There are now over thirty in San Francisco alone, and they are spreading in every direction from the extreme north of Washington Territory southward to New Mexico. Mrs. Stanford, in memory of her beloved and only child, Leland, has, herself, given over $30,000 towards these kindergartens, but better than all, she gives them her own loving heart, full of tender sympathy for helpless, neglected childhood. Her visits are red-letter days in the children's calendar; seven hundred were enrolled in those supported by her in 1887.

Four private individuals each sustain a free kindergarten, as also does the Produce Exchange of San Francisco. The school-board has had two experimental classes, and has appointed Miss Anna Slovall, their former principal, Kindergarten Inspector of Primary Schools, where Frœbel's system is doing good work among children of the eighth grades. The school-board has also appointed her as instructor of the primary teachers of all grades, so that virtually, the kindergarten forms part of the school system. In October last, the Union and Bohemian clubs played a match for "sweet charity," the net receipts of which were $1,185.50, three-fifths of which, $711.30, was given to twenty-seven free kindergartens; with an annual enrolment of 2,749 children, this would allow about twenty-six cents to each child. Time would fail to give an account of all the agencies to raise money and provide food, clothing, toys and entertainment for the little ones of the kindergarten.

FIRST ANNUAL REPORT OF THE KINDERGARTEN FOR THE BLIND.

This beautiful building situated in Roxbury, was dedicated April 19th, 1887, and received its first pupils, ten in number, May 2. The building, which cost nearly $18,000, had a debt of $11,000 cleared at the dedication. Mr. Anagnos, a Greek, who is the director, made a strong plea for an endowment of $100,000. Part of this sum is raised; the balance will be forthcoming soon, without doubt, when the enterprise will be an assurred success. At a meeting held in Tremont Temple, June 7th, 1887, for the Commencement exercises of the Perkins' Institution and Massachusetts School for the Blind, one pretty sight was that of ten little blind ones from the Kindergarten, modelling in clay the "History of Grandmother's Johnny-cake." Each child made a model of some one or more implements necessary to its production, and held them up, explaining their use. Plough, harrow, hoe, mill-stones, sacks of grain, wagon, pan, scoop, spoon, molasses-jug, miner's cap and lamp, coal-hod and stove were all there; the smallest ones made the cake itself. Then they sang a song, written by a former pupil of the school, about all the workers who were required to prepare the materials for the Johnny-cake. This scheme has taken five years to work up; the last words of Mrs. Anagnos to her sorrowing husband were: "Don't forget the dear little blind children." Here indeed they will be well remembered and well cared for and prepared to face life with chances of success vastly increased. All the world around us is awakening to the need of kindergarten training. How long shall we remain indifferent to its benefits? How long before our wealthy men and women will see the value of the kindergarten, not only for the children of the well-to-do, but also as the surest means of diminishing crime and pauperism by training the little ones, still unspoiled, to intelligence and virtue? C.

Halifax, N. S.

S.P.C.A. Column EDUCATIONAL REVIEW].

A HUMANE MOVEMENT.

The death of Mr. Henry Bergh, who has devoted many years of his life to the promotion of the humane treatment of animals, calls renewed attention to the objects and general scope of the Society for the Prevention of Cruelty to Animals.

Like the other numerous benevolent societies now existing, this has attained the nature of a movement and is making its way round the world. The first S.P.C.A. was organized in England, in 1824, and it was not until 1866 that the first American Society was founded in New York. Societies now exist not only in Great Britain, but throughout Europe, America, Asia, Africa and Australia, amounting in all to about three hundred. The movement has been productive of good to mankind as well as to the lower animals, and has promoted a general spirit of kindness among the members of the societies. For instance, the New York Society for the Prevention of Cruelty to Children, was the immediate outcome of the S.P.C.A. of that city. It is related that a lady who found a child suffering from cruel treatment reported the case to the police, but they discouraged her by saying that they could not interfere between parents and children. A lawyer to whom she applied told her the same. But she did not give up. She applied to Mr. Bergh, president of the S.P.C.A., and told him she had "found a little animal that was suffering from unkind treatment from a woman." She very ingeniously kept the fact that it was a human animal from Mr. Bergh until he had promised to take the case in hand. When she told him that it was a little child, he replied, "Well, you have done this cleverly, and I will not go back from my promise." The case was carefully investigated, but brought such a multiplicity of similar cases before the notice of Mr. Bergh

that he was obliged to inaugurate a Society for the Prevention of Cruelty to Children. This idea soon found its way to England, and while America has the honor of establishing the first S.P.C.C., England was not slow to follow, and similar societies were very soon formed in Liverpool and London.

To many, however, the most hopeful and important branch of the whole movement is the Bands of Mercy. The first Band of Mercy in America was formed in Massachusetts in 1882, and now has a membership of three hundred thousand. In both the United States and France, the Bands have been introduced into the schools and become part of the educational system of these countries.

St. John has the honor of being the first city in Canada in which the Bands of Mercy have been formed; and in one year after the inauguration of the movement here, the membership numbered twelve hundred. This branch of the movement is under the especial jurisdiction of the Ladies' Committee, as is the case in other places.

The great interest in this department arises from the conviction that the future is in the hands of the children, and the most enduring work is to be done among them. Through the literature and general work of the Bands much more is taught the children than the mere humane treatment of animals. The essays, annual gatherings, etc., stimulate the members to observe the habits of animals and acquaint themselves with the general facts of the animal kingdom. Their minds are also awakened to the sufferings of human beings and imbued with a desire to treat each other kindly. F.

St. John, N. B.

In a recent address of Sir Lyon Playfair, President of the British Association, relating to questions of scientific and industrial training, and their effects on national life and national prosperity and progress, occurs the following passage which is full of most important truth. He says:

"In the school a boy should be aided to discover the class of knowledge that is best suited for his mental capacities, so that in the upper forms of the school and in the university, knowledge may be specialized, in order to cultivate the powers of the man to their fullest extent. Shakespeare's educational formula may not be altogether true, but it contains a broad basis of truth:

"'No profit goes where is no pleasure ta'en;
In brief, sir, study what you most affect.'"

In this quotation the truth we have often urged in these pages is clearly expressed, viz.: that there should be adaptation of training to each pupil's needs and peculiarities in our schools.

SIR JOHN WILLIAM DAWSON.

[Principal and Vice-Chancellor of McGill University.]

The subject of this brief sketch, although nearly sixty-eight years of age, is at present apparently in full prime vigor of life, to judge by the enormous amount of scientific and educational work which he continues to accomplish. He stands at the head, not only of Canadian, but of American scientists, and his accomplishments have won for him in the old world a place in the front ranks of the great men whose names will go down honored to the future ages. He was born at Pictou, Nova Scotia, 13th October, 1820, was educated in the Pictou Academy, and commenced his work in natural history when only twelve years old by making a collection of the fossils of the carboniferous rocks of the county. From the academy he went to the university of Edinburgh, where he paid special attention to natural history subjects and practical chemistry. In 1842, he studied the geology of Nova Scotia, in company with Sir Charles Lyell. In 1846, he completed his university course at Edinburgh. Returning home he continued his investigations, constantly publishing his observations and discoveries in scientific periodicals and in the transactions of learned societies. He was invited by the authorities of Dalhousie College to give a course of scientific lectures in Halifax which won for him the reputation of a popular lecturer. In 1850, he was appointed the first superintendent of education in Nova Scotia. He took a prominent part in the establishment of the Normal School in Nova Scotia,

and as a commissioner appointed by Sir Edmund Head in the regulation of the University of New Brunswick. With extraordinary energy and a vision far ahead of his contemporaries he commenced the organization of provincial education. He published a work on agriculture for the schools which went through two editions, and a hand-book of the geography and natural history of Nova Scotia; but not until the REVIEW took the matter in hand has there since been so much attention paid to the development of the industrial natural history of the country. The government being too timid or too conservative to carry out his projected reforms, he resigned his office and accepted the position of principal of McGill University and professor of natural history. The shadow went back then on the dial of scientific educational progress in Nova Scotia several degrees. But three decades of general progress have prepared a new generation for the more complete realization of our first superintendent's dream.

He is the author of a very great number of scientific papers. Some of his better known books were published as follows: 1855, "Acadian Geology." 1859, "Archaia, or Studies of Creation in Genesis." 1863, "Air-Breathers of the Coal Period." 1864, "Hand-book of Scientific Agriculture." 1868, "Acadian Geology," enlarged edition. 1870, "Hand-book of Canadian Zoology," the latest edition of which is a text-book in the Nova Scotian Summer School of Science. 1873, "The Story of Earth and Man." 1874, "Science and the Bible." 1875, "The Dawn of Life." 1877, "Origin of the World." 1880, "Fossil Men." 1881, "The Chain of Life." 1887, "The Geological History of Plants" (International Science Series).

Some of his principal honors were won as follows: Fellow of the Geological Society, 1855; M.A., 1856; LL.D., 1857; Fellow of the Royal Society, 1862; First President of the Royal Society of Canada, 1881; C.M.G., 1882; President of the American Association for the Advancement of Science, 1882; Knighted, 1884; President of the British Association for the Advancement of Science, 1886.

Sir J. W. Dawson's genius has made the University of McGill known over the whole world; and makes the commercial metropolis of Canada, French Montreal, pose in imagination as an English university city. It is hoped he may be present this summer to address the interprovincial convention of teachers at St. John.

DEER are increasing in numbers to the west of the river St. John. There are no moose or caribou on that side of the river. Wolves are also being seen in increasing numbers in our woods. These follow on the track of the deer. A few days ago a huge wolf was seen in the woods a short distance back of Harvey station.—*Saint John Globe.*

EDUCATIONAL REPORTS.

We have received the report of Chief Supt. Montgomery on the schools of Prince Edward Island, for the year ending June 30th, 1887. The document is an interesting one, and satisfactory progress is shown in education compared with former years. There were 505 teachers employed for the year over as many school departments, with only five districts without schools. There were 22,460 pupils enrolled, giving an average to each teacher of 44. The pupils made an average daily attendance of 12,325, or an average to each school of 24. The percentage of enrolled pupils daily present was 54.88. In 1886, this percentage was 56.27—the highest of any province in the Dominion for that year. The following is the average salary paid to teachers:—

Male Teachers,	1st Class	.. ....	..	$400 88
" "	2nd "	.. ....	..	270 24
" "	3rd "	.. ....	..	217 96
Female "	1st "	.. ....	..	311 18
" "	2nd "	.. ....	..	213 57
" "	3rd "	.. ....	..	157 34

Though the average salaries of teachers is less than in New Brunswick and Nova Scotia; it is a noteworthy fact that there is less disproportion between the salaries of male and female teachers than in either of the other provinces. The salary of first class female teachers is greater than in Nova Scotia, and nearly equal to that in New Brunswick.

In regard to subjects of study, reference is made in the report to a marked increase of those having a practical bearing, but regret is expressed that "the programme of studies for the whole school is adapted to the needs of the few who are preparing to enter the professions. This is an abuse of our educational advantages. . . . . Only one in about 200 of our young people ever go beyond the common district school, and less than one in every 1,000 enter the universities. The education given in the common schools, therefore, should train the young principally for the duties of practical life."

The report of Geo. S. Milligan, LL. D., superintendent of the Methodist schools of Newfoundland, for 1887, has been received. 130 schools under the Methodist board were in operation during the whole or part of the year, giving employment to 114 teachers. The whole number of pupils attending the 130 schools was 6,903, with an average of 3,704.

There is other matter of interest in the report, but there are two additional reports that have to be consulted in order to get complete educational statistics for the Island. As these are not at hand for com-

parison, we have not the data for presenting any adequate view of education in Newfoundland.

[Inspector Hinkle Condon]

As regards the poor teacher, the inspector admonishes, suggests, lays out the work, but reflecting on the improbability of finding the same teacher at his next visit, is disheartened as he thinks of the slender chance of progress a school may expect to secure from a changing succession of such hirelings. His own helplessness in the matter is painful.

If we could have the one term arrangement and no engagement for less than a year, the inspector might have the opportunity of making the government grant for the second payment contingent on fair honest work; but under the present order of things, when he returns on his semi-annual visit, he may find that even the register has not been correctly kept; nevertheless, the government money has been paid, and the unfaithful teacher has gone into some other section or district to play the same farce over again.

[Inspector James H. Munro.]

A gratifying feature deserving of mention, is the longer continuance of teachers in one section. At the beginning of the summer term, comparatively few changes were made, especially in Yarmouth district. This is a hopeful sign indicating that the trustees understand that frequent changes mean unprogressive schools and wasted funds. And may we not hope that teachers also are assisting to bring about this improvement?

The new course of studies is now fairly launched. The completeness of the course is its admirable feature. It ensures to the young people of our country a whole education in all that is necessary as a preparation for business, or as a foundation for collegiate training.

[Inspector L. S. Morse.]

It is gratifying to know that trustees and parents in many of our most desirable sections are growing in their appreciation of teachers who have received a normal training and who adopt normal methods of instruction. This fact is inducing larger numbers of our teachers to attend the normal school and to receive training at the hands of the competent staff of instructors in charge of that institution.

It is but just to add that those teachers who have succeeded in grading their schools as required, and in systematically following the course of work prescribed, are unanimous in their appreciation of its value as a guide to sound systematic instruction. On the other hand, the attention of those who have been less successful in grading their school has been plainly called to the fact that the affidavit which they are required to make at the end of each term, obliges them to swear that they have taught according to law, which may now fairly be interpreted to mean, among other things, according to the course of study.

QUESTION DEPARTMENT.

Questions on scientific subjects may be addressed to EDUCATIONAL REVIEW, Pictou, N. S., to whom also all natural history specimens may be submitted for identification; those on ancient classics and mathematics to EDUCATIONAL REVIEW, Charlottetown, P. E. Island, and all questions on general subjects—English, school management, methods, etc.—to EDUCATIONAL REVIEW, St. John, N. B. On technical questions the editors will seek the views of teachers of experience, in order that this page may be of the greatest possible advantage to our teachers.

Questions and Answers.

H.—The enclosed sponge comes from the Baie de Chaleur. I have not observed it on the southern coast of New Brunswick. Please determine it.

Your sponge is a species of *Isodictya*, not uncommon in the gulf.

TEACHER.—From an article a few months ago in the REVIEW it appeared to be suggested that carbonic acid was not the only injurious constituent of badly ventilated schoolrooms. What else is injurious?

An answer to this is given in a late number of *Science*, in which it is stated that Prof. Brown-Séquard has recently been making experiments to determine whether the human breath was capable of producing any poisonous effects. From the condensed watery vapor of the expired air he obtained a poisonous liquid, which, when injected under the skin of rabbits, produced almost immediate death. He ascertained that the poison was an alkaloid, and not a microbe. The rabbits thus injected died without convulsions, the heart and large blood-vessels being engorged with blood. Brown-Séquard considers it fully proved that the expired air, both of man and animals, contains a volatile poisonous principle which is much more deleterious than carbonic acid." But as carbonic acid is more easily detected and quantitatively determined, its amount is in practice taken as the measure of the degree of contamination of air from the products of respiration.

D. M. S.—What course would you recommend for a beginner in botany?

Get such a book as Gray's "How Plants Grow," with Spotter's Botany, Part II.; or Gray's "School and Field Book of Botany," and examine, analyze and determine every different flowering plant as soon as you find it in bloom. A lens will be necessary for the examination of very small flowers. Do the work of determining the name of the plant yourself. That will compel you to study vegetable morphology as a

botanist; and the discovery of a rare plant will be a more pleasurable episode than the landing of a Margaree salmon.

E. H.—Please give in your next issue a programme of exercises for Arbor Day; also, a plan of keeping a record of trees planted.

We will publish a programme in our next—to be issued on or before May 10th. The subjoined place, modified to suit circumstances, may serve your purpose.

KIND.	DATE.	LOCATION.	DEDICATED TO
Elm.....	May 25	First Row, No. 1...	Lt. Governor.
Wild Rose	May 25	East Front Window	Chief Supt.
Virginia Creeper	May 25	West Front Window	Inspector.
Maple.....	May 25	Second Row, No. 6	Teacher.
Evergreen.....	May 25	Third Row, No. 2..	Educ. Review.

Trees may be numbered from east to west or north to south; rows *vice versa*.

PERSONAL NOTES.

His Excellency the Governor in Council, has been pleased to appoint the Rev. A. C. Waghorne to be a member of the Church Board of Education for Fortune Bay, in place of Rev. George Field, left the district. The Rev. Mr. Waghorne is the botanist of Newfoundland. He is now preparing a book on the native fruits of the Island, which should be an extremely interesting work to Canadians with a botanical taste.

The marriage of Mr. W. F. Ganong to Miss Carman of Fredericton took place at Cambridge, Mass., on the 4th of April. The REVIEW extends its congratulations to the happy couple and wishes them a happy and prosperous wedded life.

One of the forthcoming volumes of the series of "Canterbury Poets," is being edited by Prof. C. G. D. Roberts, of Kings College, Nova Scotia. It is to be called "Poems of Wild Life," and will include a large number of selections from American and Canadian poetry.

BOOK REVIEWS.

Notes and Observations on the KWAKIOOL PEOPLE OF VANCOUVER ISLAND, by Dr. George M. Dawson, F. G. S., F. R. S. C., Assistant Director of the Geological Survey of Canada.

This is a reprint from the transactions of the Royal Society of Canada, Vol. V., Sect. II., 1887. Dr. Dawson is a son of Sir J. W. Dawson. He is yet a very young man, but has already added more to our knowledge of the natural history of Canada than most of our scientific men. His untiring energy has been shown in the information which he has collected on so many different subjects. In this paper he describes the territory and boundaries of the Kwakiool people, their tribal sub-divisions, mode of life, arts, customs, traditions, folk lore, religion and actual condition, with a classified vocabulary of seven hundred words of the language.

EDUCATION IN BAVARIA, by Sir Philip Magnus. This is the title of No. 2 of a series of monographs published by the Industrial Education Association of New York, and is a reprint of the observations of Sir Philip Magnus on industrial education in Bavaria. It is a timely and excellent contribution to this subject. The monographs of this association are issued bi-monthly at twenty cents each, or $1.00 per annum.

THE SANITARY CONDITIONS AND NECESSITIES OF SCHOOL-HOUSES AND SCHOOL LIFE is one of four pamphlets published by the American Public Health Association, Concord, N.H. The other three deal with Healthy Homes, Infectious Disease, and Cause of Diseases among Workmen. The four essays have been written by eminent specialists in each subject, and are the outcome of four prizes aggregating $1,100, offered by Mr. Henry Lomb, of Rochester, N. Y. They are exceedingly valuable from the plain and direct manner in which they are written, their practical suggestions for preserving the health, and the suggestions they contain for building and ventilating houses. The advice they offer, if carried out, would undoubtedly lead to a great decrease in suffering and misery. The four essays may be had for twenty-five cents.

PRACTICAL PHYSICS FOR SCHOOLS, *Vol. I., Electricity and Magnetism*, by Balfour Stewart and W. W. Haldane, Gee., *London*, MacMillan & Co., New York, 1888.

This is a magnificent little book of about 200 pages, which no person teaching physics in our public schools should be without. It forms a hand-book, giving directions for quantitative experimental demonstrations; so full and complete in their course, so concise in their wording, and so clear in their meaning and illustrations, that we cannot well imagine an improvement on the presentation of the subject.

Dr. Lorenzo Gordon Yates, Cor. M. S. F. Micr. Soc., Assoc. Memb. Philos. Soc. of London, etc., of Santa Barbara, Cal., U. S. A., assisted by John Gilbert Baker, F. R. S., F. L. S., etc., of the Royal Herbarium at Kew, England, is preparing a cheap work on "*All Known Ferns.*"

SCRIPTURE READINGS for use in the public and high schools of Ontario. We have to thank the Minister of Education of Ontario for a copy of this work. The names of the committee of eminent men representing the leading religious bodies of the Province of Ontario, who have carefully examined and sanctioned the use of the scripture readings for high and public schools, are a sufficient guarantee that the selections are in every way suitable to meet the general desire for the promotion of religious instruction in the schools of that province. Perhaps a clue to the wonderful success of the public school system of Ontario may be found in the declaration made by the educational department when adopting this volume of selections from the scriptures for the use of the schools: "Christianity is the basis of our whole system of elementary education, and its principles should pervade that system throughout."

ENGLISH CLASSICS for Indian University students: Goldsmith's *The Traveller* and *The Deserted Village*, edited by Arthur Barrett, B. A., Professor of English Literature, Elphinstone College, Bombay. Scott's *Marmion*, edited by Michael MacMillan, B. A. Shakespeare's *Much Ado about*

Nothing, edited by R. Deighton, M. A., Inspector of Schools, Bareilly. The main object in editing this series is that of explaining as simply and as clearly as possible everything that in point of thought or idiom is likely to prove a difficulty to a foreigner. While these classics are designed for a special class of students, they will be found of equal value to English students everywhere.

MacMillan's Progressive French Course, first year, by G. Eugene-Fasnacht. *The Teacher's Companion* to MacMillan's Progressive French Course, first year, by G. Eugene-Fasnacht. *Florian's Fables*, with philological and explanatory notes, exercises, dialogues and vocabulary, edited by the Rev. Charles Yeld, M. A. These are handy and admirable little books for the student of French, and contain copious notes on the text, and sufficient vocabularies.

The Manual Training School: Its aims, methods and results, with detailed courses of instruction in shopwork and drawing. By Prof. C. M. Woodward, of the Manual Training School, Washington University, St. Louis. Six by nine inches, cloth, 374 pages. Price $2.00. D. C. Heath & Co., Publishers, Boston, New York and Chicago.

This book is exceedingly valuable on account of its practical nature. Full instructions are given as to the organization and conducting of a manual training school. It contains courses of study, programmes of daily exercises and working drawings, and descriptions of class-exercises in wood and metal. In the chapter on the Complementary Nature of Manual Training, the author says, "Teach language and literature and mathematics with a view to make each child a master of the art of verbal expression. Teach mechanical and free drawings with the conventions of shade and color, and aim at a mastery of the art of pictorial expression; and lastly, teach the cunning fingers the wonderful power and use of tools, and aim at nothing less than a mastery of the fundamental mechanical processes. To do all these things while the mind is gaining strength and clearness and material for thought, is the function of a manual training-school."

An Explanatory Digest of Professor Fawcett's Manual of Political Economy. Cyril A. Watters, B. A., has prepared a digest of the late Professor Fawcett's well-known manual of Political Economy, for the use of candidates preparing for examination. It will be found a helpful explanatory guide to the more important principles of the science.

Conscious Motherhood, the useful book mentioned in the last number of the Review, has the special sanction of Miss Peabody, to whom it is dedicated. It is published by the Inter-state Publishing Company, 30 Franklin St, Boston.

BOOKS RECEIVED.

The Concise Imperial Dictionary, J. E. Bryant & Co, Publishers, Toronto, Ont.

Sea-Side and Way-Side; Nature Readers, No 1: D. C. Heath & Co, Publishers, Boston.

An Elementary Geography of the British Isles, by Archibald Geikie; Publishers, MacMillan & Co., London and New York.

A Second School Poetry Book, MacMillan & Co, Publishers, London & New York.

Twelve English Statesmen; No. 1, William the Conqueror; London, MacMillan & Co, and New York.

EXCHANGES.

The American Geologist, Vol. I., No. 3, is before us. We have here a geological journal in the best sense of the name. Its staff of editors alone is a guarantee of its value. Its editors and proprietors are the following: Prof. Samuel Calvin, University of Iowa; Prof. Edward W. Claypole, Butchel College, Akron, O.; Dr. Persifor Frazer, Franklin Institute, Philadelphia; Dr. Lewis E. Hicks, University of Nebraska; Mr. Edward O. Ulrich, Geological Survey of Illinois; Dr. Alexander Winchell, University of Michigan; Prof. Newton, H Winchell, University of Minnesota Single numbers thirty-five cents Yearly subscription $3.00.... *The Swiss Cross* for April is a valuable number. The first article, "The Geology of the Sea-Floor," is especially interesting at the present time, on account of the discussion upon the respective merits of Darwin's and Murray's theories of coral island formation....In *Century* for April is a valuable illustrated article, "The American Inventors of the Telegraph," which contains portraits of those who invented and helped to perfect the system. There is also a full explanation of its workings....*St Nicholas* for April opens very seasonably with an article, "What makes it Rain?" which is very instructive reading for old or young. "Child-sketches from George Eliot," is another excellent article in this number....The *Scientific American* is a weekly paper, that has for nearly half a century kept a faithful record of scientific growth and activity. Its pages have stimulated many a youthful student to think and work. Two excellent illustrated articles in recent numbers, are descriptions of the Lick Observatory in California, and the proposed International Exhibition in Paris in 1889.... *The Popular Science Monthly* for April contains among other valuable matter, educational and scientific, an illustrated article on "The Earliest Plants," by Sir William Dawson. There is a thoughtful letter on the lack of individuality in our schools ....*Farm and Fireside*, the supplement of the Toronto *Weekly Mail*, has been especially valuable of late to working botanists and agriculturists from its illustrated articles on grasses, grains, potatoes, with proper methods of cultivating these....The Halifax *Presbyterian Witness*, an eight page weekly, devotes each issue, not only to the discussion of religious questions, but takes a healthy interest in educational, literary and other timely topics....The Sackville *Argosy*, published by the students of Mt. Allison University, is one of the best conducted and most neatly printed of our college exchanges....*Bookmart* for April, from Bookmart Publishing Company, Pittsburg, Pa., has been received. This magazine is unique, in that it publishes much that is valuable in literature, which does not find its way into other periodicals....*The Illustrated London News* for March 31st and April 7th, are of great value to the historical student, as they contain illustrations and descriptions of the last hours of the Emperor of Germany, and of the entrance of his successor to imperial life.

N. S. SUMMER SCHOOL OF SCIENCE, 1888.

The School will convene on Monday, July 23rd, at 7.30 p. m., in the Convocation Hall of Pictou Academy, and will close August 2nd. Opening address by F. H. EATON, M. A.

FACULTY OF INSTRUCTORS:

A. H. MacKay, A. B., B. Sc., F. S. Sc., [Lond.], Principal Pictou Academy, President and Instructor in Zoology.

A. G. McDonald, A. M., Inspector of Schools, Antigonish, Instructor in Land Surveying and Field Work.

F. H. Eaton, A. M., Normal School, Truro, Instructor in Physics.

E. J. Lay, Esq., Inspector of Schools, Amherst, Instructor in Botany.

H. W. Smith, School of Agriculture, Truro, Instructor in Chemistry.

John Stewart, M. D., [Edin.], Pictou, Instructor in Physiology and Hygiene.

A. J. Denton, A.B., Halifax Academy, Halifax, Instructor in Geology.

A. J. Pineo, A. B., Pictou, Instructor in Mineralogy.

A. Cameron, Esq., Principal of Yarmouth Academy, Instructor in Astronomy.

J. B. Hall, Ph. D., Normal School, Truro, Secretary.

J. D. Sprague, Esq., Liverpool Academy, Asst. Secretary.

Courses of Study:

ZOOLOGY.

Lectures.—[*a*] Collection and general classification; [*b*] Insects; [*c*] Birds; [*d*] Dissection of a few type forms.

Preparatory Work.—[*a*] Classification as in Dawson's *Hand-Book* down to orders; [*b*] Dissection and description of any ten species as in Colton's *Practical Zoology*; [*c*] Collection of fifty Zoological specimens (Nova Scotian), as insects; microscopic slides, bird skins, etc.

BOTANY.

Lectures—[*a*] Plant morphology; [*b*] Relation of parts of flower; [*c*] Classification and Explanation of *Key to the Orders*; [*d*] Analysis of common Phenogamous plants; [*e*] Study of trees, grasses, ferns and mosses; [*f*] Hints on preparing and preserving specimens.

Preparatory Work.—[*a*] Gray's *How Plants Grow;* [*b*] Analysis (or drawings illustrating important points of structure) of fifteen plants not figured or described in detail in books; [*c*] Fifty Nova Scotian Species named and mounted.

PHYSICS.

Lectures.—[*a*] Physical properties of matter; [*b*] Atmospheric Pressure; [*c*] Specific Gravity; [*d*] Work and Heat.

Preparatory Work.—[*a*] Properties of matter; Dynamics of Fluids and Heat, as in Gage's Physics, Chapters I. II. and III.; [*b*] Written report of experiments performed during the year, with descriptions of apparatus used. Experiments illustrating the above subjects performed in presence of instructor. Those who intend to take this course are asked to notify the instructor at once; and to make a report at the end of each month.

CHEMISTRY.

Lectures.—[*a*] Hydrogen and Oxygen; [*b*] Nitrogen with its compounds; [*c*] Carbon and its compounds; [*d*] Chlorine and its compounds; [*e*] Atomic Theory.

Preparatory Work.—[*a*] Chemistry Primer; [*b*] Written report of experiments performed during the year, with a description of the apparatus, materials, and results; [*c*] Experiments performed in presence of instructor.

PHYSIOLOGY.

Lectures.—[*a*] Anatomical data; [*b*] Chemistry and Physics of the Digestive System; [*c*] The Circulatory system; [*d*] The Respiratory system; [*e*] Nervous system; [*f*] Practical Application of the Laws of Physiology to Individual and Social Health.

Preparatory Work.—Huxley and Youman's text-book.

Land Surveying and Field Work.

Lectures and Practical Demonstrations.—[*a*] Adjustments and use in the field of Transit and Theodolite; [*b*] Determination of magnetic variation; [*c*] Chain and Traverse surveys of some irregular field, and keeping of necessary Field Book; [*d*] Determination of Heights and Distances.

ASTRONOMY.

Lectures and Demonstrations.—[*a*] Use of Sextant in determining Latitude and Longitude; [*b*] Evening Study of Constellations.

Preparatory Study.—Lockyer's Astronomy and Belcher's almanac for 1888. Those who wish to take this course are requested to correspond with the instructor, notifying him of the fact, and stating what part of the study is most interesting to them, and what difficulties they may have encountered.

GEOLOGY.

Lectures.—[*a*] Aqueous Agencies, [*b*] Igneous Agencies; [*c*] Pre-carboniferous Rocks; [*d*] Carboniferous Rocks; [*e*] Post-Carboniferous and Drift. Special reference to Nova Scotia Geology.

Preparatory Work.—[*a*] Shaler's First Book in Geology; [D. C. Heath & Co., Boston], [*b*] Collection of 50 fossil rocks or other geological illustrations.

MINERALOGY.

Lectures.—[*a*] Principles of Classification; [*b*] Directions for Laboratory work and Supervision of same.

Preparatory Work.—[*a*] Crosby's *Common Rocks and Minerals;* [*b*] Collecting and naming 50 Nova Scotian minerals; [*c*] Determination by blow-pipe and chemical tests of fifteen Nova Scotia species selected by examiner.

Examinations, Certificates, Prizes and Exercises.

Before the close of the school, each instructor will hold an examination in the subjects of his department, and to those students who shall be reported as having undergone a satisfactory examination in three or more subjects, the faculty will award a certificate or diploma.

For examination purposes, the work of each subject will be divided into three sections of equal value as follows: [*a*] Prescribed text-book and lectures; [*b*] Practical and original work, such as dissecting, experimenting, etc.; [*c*] Collections, mountings, apparatus. The purpose of this arrangement is to lay the chief stress on *real* knowledge of a practical character, rather than on knowledge derived chiefly from text-books.

The lectures and demonstrations during the session of the school are intended especially to elucidate facts and principles that are more or less obscure, and to exhibit the best methods of teaching elementary science. All laboratory work will be done by the aid of the simplest equipments such as are within the reach of the common schools of Nova Scotia.

A prize of $10.00 will be given for the best set, and another prize of $5.00 for the second best set, of home made apparatus adapted for the use of common schools in illustrating the principles of Physics and Chemistry.

Excursions to the Coal Mines, Glass Works and Nova Scotia Steel Works will be arranged. In addition, there will be numerous excursions in various directions for collecting specimens in Botany, Zoology, and Mineralogy.

Besides affording its students an opportunity to become acquainted with the best methods of acquiring and teaching the natural sciences, the Summer School brings together in pleasant holiday association many of the best teachers of the province; and so not only enlarges each one's circle of acquaintance, but helps to promote a higher professional enthusiasm, and to cultivate a more liberal educational spirit.

In addition, Pictou with its bracing air, magnificent harbor and unique scenery, is unsurpassed as a summer resort; and those interested in the objects of the school cannot spend two weeks elsewhere in midsummer more pleasantly and profitably.

To defray necessary expenses a tuition fee of $3.00, payable in advance, will be charged. Board may be obtained for $3.00 per week. Prescribed books may be had at the Pictou bookstores. It is expected that reduced rates will be available on all railway and steamboat lines.

Applications from those wishing to attend the school should be made to the Secretary as early as possible—at latest before June 1st, 1888. In order to facilitate the construction of a time-table, the applications should specify the courses which the applicant intends to take.

Further information may be obtained from the President, the instructors, or the Secretary.

J. B. Hall,
Secretary.

Truro, March 1st, 1888.