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THE EDUCATIONAL REVIEW.

FOR THE ATLANTIC PROVINCES OF CANADA.

Vol. III.

SAINT JOHN, N. B., JUNE, 1889.

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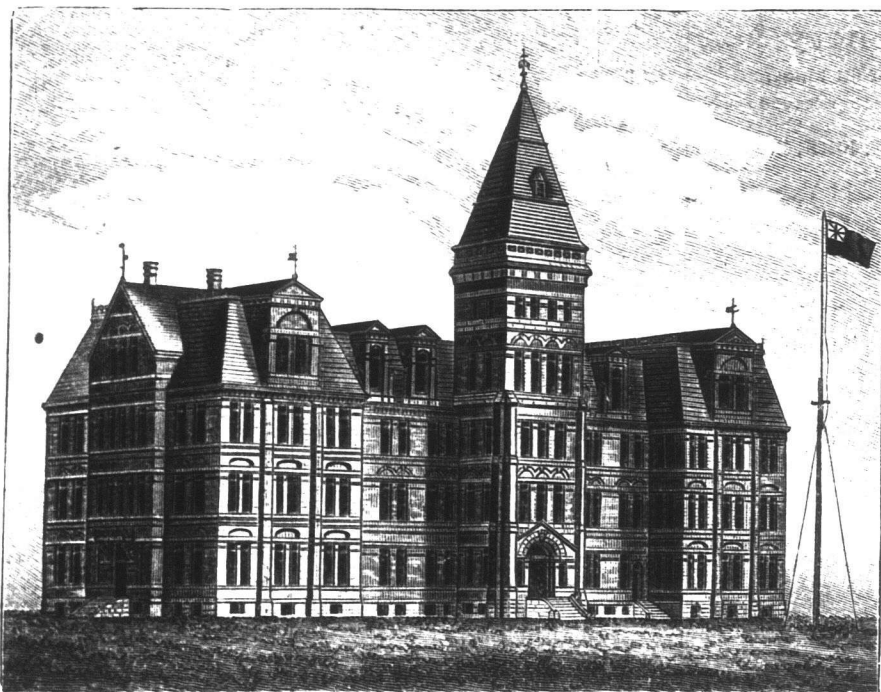
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VOL. III. No. 1

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EDITORIAL NOTES.

AS WE are now entering upon the third year of our journal's existence, we may say, that we hope that our readers may find us sparing no reasonable effort or expense to make the REVIEW useful to all classes. We feel that for the common school teacher and the young student we must make an effort for further simplification and condensation in our teaching aids. While for the more advanced we must attempt higher and more systematic outlines. Our work in natural science is not to recast the matter already in our text-books, but to supplement the schoolroom and the learning public with aids for which there are no appropriate text-books. This is one reason why lessons on nature should be made a specialty in educational papers at the present time. We are not confined to any special department of work however. As the demand may vary, so shall we endeavor to secure supply. Our object will be to stimulate the acquirement of practical knowledge, instead of fictitious knowledge; a knowledge found by examining nature, as it is, instead of imagining how it ought

to be. The best education is that which makes man the most useful. The highest culture is the one which in the long run makes man the happiest and best servant of his race.

ATTENTION is directed to our advertising columns of this issue. Our readers will find there a variety of interesting matter.

THE programmes of the N. B. and N. S. Educational Conventions will be found elsewhere; also the standards for matriculation to N. S. colleges.

THE closing exercises in connection with the Mt. Allison institutions at Sackville are just over as we go to press. The year has been a remarkably prosperous one, not only to the college but to the academies. The number of students in attendance has equalled if not exceeded that of previous years, and the popularity of these institutions is shown by the numbers who assemble from all quarters to witness the anniversary exercises, the enthusiasm that is called forth on these occasions, the good feeling which exists between faculty and students, and the liberal support which is being extended to Mt. Allison, not only by the immediate friends of the institution but by the public at large in the three provinces. The excellent administration of Dr. Inch and his able assistants makes a still greater success and popularity probable in the coming years.

THE American Institute of Instruction, of which Ray Greene Huling, New Bedford, Mass., is the secretary, will meet this year on July 8 to 12, at Bethlehem, N. H., amid the fine scenery of the White Mountains.

THE general interest aroused by our astronomical articles warrants our giving more careful attention to our astronomical notes than heretofore. The calculations are made specially for the Atlantic provinces; and it is hoped they are just of a kind most likely to be useful to the student desirous of making a practical acquaintance with the elements of this sublime and useful science.

THE fifty-sixth annual convocation of the Faculty of Arts, McGill University, Montreal, took place on the afternoon of April 30th. The address of the Principal, Sir Wm. Dawson, was an able review of what the university and its affiliated associations have accomplished in the past for the higher education, and what may and ought to be accomplished in the future.

FROM Vancouver Island, in rocks designated by Dr. G. M. Dawson as cretaceous, Sir William Dawson finds in addition to other vegetable remains the leaves of a number of the genera of exogenous trees and plants, among which are probably *Ficus*, *Alnus*, *Betula*, *Quercus*, *Diospyros*, *Cinnamomum*, *Ceanothus*, *Populus*, *Salix*, *Proteoides*, *Juglans*, *Rhamnus* and *Aralia*.

A SPECIES of moss, new to science, has been discovered by a New Brunswick botanist, Mr. J. Moser, who has made a specialty of collecting in this department of our flora. The species in question has been referred to a celebrated Swedish specialist, who pronounces it a new species.

THE annual meeting of the National Educational Association of the United States will take place this year at Nashville, Tenn., July 16 to 20.

THE Rev. James Anderson, M. A., purposes holding a Summer School for instruction in the Tonic Sol-Fa notation of music and examination for certificates, to continue for twelve days, beginning about the middle of July, at Pictou or New Glasgow, N. S.

DALHOUSIE PROFESSORSHIP.

Mr. Archibald MacMechan has been appointed to the George Munro professorship in English History, Dalhousie University. Mr. MacMechan graduated at Toronto University in 1884, taking first-class honors in English, French and German. During the two following years he was engaged in teaching at the Brookville High School and at the Galt Collegiate Institute. In 1886 he applied for and received a scholarship in English and cognate subjects at Johns-Hopkins University; and in 1887-8 he obtained a scholarship in the same. He is now concluding his studies leading to the doctorate of philosophy in the Johns Hopkins University. He was elected as having the best testimonials out of a large number of candidates, some of whom are already well and favorably known to the literary world.

N. B. UNIVERSITY ENCŒNIA.

Encœnia at the New Brunswick University will take place at 3 p. m., Thursday, June 20th, when, for the first time in the history of that honored institution of learning, a lady (Miss Tibbits) will appear as a candidate for the degree of B. A.

Prof. Kierstead, of Acadia College, will deliver the Alumni oration. There will be a large number of candidates for the degree of B. A., and several for M. A. Prof. Burwash, of Mt. Allison, will address the graduating class. The Encœnia will thus present somewhat of an inter-collegiate aspect, owing to the senate's action in appointing representatives of the universities of Acadia and Mt. Allison to its examining board. Thus the University of N. B. has been the first to give effect to the broad ideas of a closer collegiate union, which found expression during the session of the Interprovincial Convention last summer.

The board of examiners for the degrees for the present year is as follows:

In Mathematics.—Prof. Harrison, LL. D., Havlock Cox, Esq., A. M.

In Classics.—Prof. Bridges, Ph. D., Rev. Goodridge Roberts, M. A.

In Philosophy.—Prof. Dyde, D. Sc., Prof. Kierstead, M. A.

In Science.—Prof. Bailey, Ph. D., Prof. Burwash, M. A.

In English.—Prof. Stockley, M. A., Prof. Kierstead, M. A.

In French and German.—Prof. Stockley, M. A., Rev. Goodridge Roberts, M. A.

There are seven candidates for matriculation from the Girl's High School, St. John. Matriculation examinations will be held at the Victoria School, St. John, and at the Grammar School, Woodstock, on the 6th, 7th and 8th June.

Degree examinations will begin on the 10th June.

N. B. NORMAL SCHOOL.

It is proposed to organize an Alumni and Alumnae Society in connection with the N. B. Normal School, to meet annually during the session of the Educational Institute. This is a movement that should win the hearty support and co-operation of all graduates of this institution, and we predict an enthusiastic organization at the approaching meeting of the Educational Institute.

The year just closing has been one of considerable success in the Provincial Normal School, and Principal Mullin and his staff are to be congratulated on their labors, and the excellent work that has been done in all the departments. The enrolment of students is 224. About 170 will be presented in the English department for examination for license, and it is expected that about 80 will seek advance of class, making in all about 250, a larger number than has ever come up at one time for examination for license.

NATURAL HISTORY OF ATLANTIC PROVINCES.

At the suggestion of Frank H. Eaton, M. A., president of the N. S. Summer School of Science, we give the following partial lists of works and papers on the natural history of these provinces. We are glad to learn that a Natural Science Society or Institute has just been organized for Prince Edward Island. The lack of such an institution heretofore will account for the fewer papers in our list referring specially to the Island. In many respects, however, the natural history of our smaller province is more or less included within that of the greater and encompassing provinces. We are indebted to Mr. Ganong, at present of Harvard University, through the kindness of President Eaton, for the New Brunswick list.

MAMMALS.

The Mammals of New Brunswick (an annotated list). By M. Chamberlain, Bulletin N. B. Natural History Society, No. III., 1884, pp. 37-41. [Also, lists by Hind in Rep. Geology N. B.; Gesner, "New Brunswick"; Adams, "Field and Forest Rambles," etc.]

On the Mammalia of Nova Scotia (series of excellent papers). By J. B. Gilpin in proceedings Institute of Natural Science, N. S., from 1864 to 1871. [Also papers in the proceedings of the same institute by Morrow, Gilpin, Hardy, etc., on the caribou, walrus, beaver, orthogoriscus mola, etc., and a "synopsis" by MacKay, in the "Academy." Vol. I., Nos. 2, 3, 4 and 6.]

BIRDS.

Catalogue of the Birds of New Brunswick. By M. Chamberlain, Bulletin N. B. Natural History Society, No. I., 1882, pp. 23-68. [Also lists by Gesner, Adams and others, and several lists of special regions by Boardman, Herrick and others.]

In the proceedings of the Institute of Natural Science, of Nova Scotia, the following papers:

On the Land Birds of N. S. By Downs. Vol. I., pt. 3, pp. 38-51; Vol. I., pt. 4, pp. 130-136 (1864-5).

Observations on Sea Birds. By Ambrose. Vol. I., pt. 3, pp. 51-59 (1864).

On some of the Rarer Birds of N. S. By Jones. Vol. II., pt. 2, pp. 70-74 (1867).

On the Eagles of N. S. Gilpin. Vol. III., pt. 3, pp. 202-208, (1872).

Golden Eyes or Garrats in N. S. Gilpin. Vol. IV., pt. 4, pp. 390-403 (1877).

On the Semi-annual Migration of Sea Fowls. Gilpin. Vol. V., pt. 2, pp. 138-158 (1879).

On the Birds of Prey of N. S. Gilpin. Vol. V., pt. 3, pp. 255-269 (1880).

Ornithological Notes. Downs. Vol. VI., pt. 3, pp. 326-38 (1885).

Birds of Nova Scotia (a catalogue). Downs. Vol. VII., pt. 2, pp. 377-385 (1887).

Birds of Pictou (a catalogue). MacKay. "Academy." Vol. I., No. 6.

AMPHIBIANS AND REPTILES.

Lists of Amphibians and Reptiles in New Brunswick. By Adams, in "Field and Forest"; Gesner, in "New Brunswick."

Amphibia of Nova Scotia. EDUCATIONAL REVIEW. Vol. I., pp. 233-4.

Reptilia of Nova Scotia. Jones. Proc. Inst. Nat. Sci., N. S. Vol. I., Part 3, pp. 114-128 (1864).

Notes on the Serpents of Prince Edward Island. Mellish, Proc. Inst. Nat. Sci., N. S. Vol. IV., pt. 2, pp. 163-167 (1875).

FISHES.

Annotated Lists of the Fishes of N. B. Gesner, in "New Brunswick." Perley, Descriptive Catalogue (in part) of the Fishes of New Brunswick and Nova Scotia. Govt. Report, Fredericton (1852).

Synopsis of the Fishes of the Gulf of St. Lawrence and the Bay of Fundy, by Theodore Gill, Canadian Naturalist. Vol. II., (new series). Paper 16 (1885).

In the Proceedings of the Inst. of Nat. Sci., N. S., the following papers:

On the Gaspereaux of N. S. Gilpin. Vol. I., Part —, pp. 114-128 (1864).

On the Food Fishes of N. S. Gilpin. Vol. I., Part 4, pp. 11-14 and 76-91; Vol. II., Part 1, pp. 104-112; Vol. II., Part 2, pp. 17-26.

Fish of St. Margaret's Bay. Ambrose. Vol. I., Part 4, pp. 33-43; Vol. II., Part 1, pp. 67-76; Vol. II., Part 2, pp. 87-94.

On the Salmon of N. S. Gilpin. Vol. V., Part 1, (1878).

Nat. Hist. and the Fisheries. Reid. Vol. 4, Part 2, pp. 131-137.

List of the Fishes of N. S. Jones. Vol. V., Part 1 (1879).

INSECTA.

Nova Scotian Lepidoptera. Jones. Proc. Inst. Nat. Sci., N. S. Vol. II., Part 3, pp. 78-88 (1868).

Nova Scotian Coleoptera, (by the same). Vol. II., Part 3, pp. 141-155, etc. (1869).

N. S. Diurnal Lepidoptera (the same). Vol. III., Part 1, pp. 18-27 (1870); Vol. III., Part 2, pp. 100-103 (1871).

List of Nova Scotian Butterflies. Silver. Vol. VII., Part 2, pp. 86-89 (1888).

Object Lessons on Nova Scotian Insects. EDUCATIONAL REVIEW. Vol. I. and II.

MOLLUSCA.

Marine Mollusca of New Brunswick. W. F. Ganong. Bull. Nat. Hist. Soc. No. 6, pp. 17-61 (1887).

Mollusca of Nova Scotia. Jones. Proc. Inst. Nat. Sci., N. S. Vol. VI., Part 3 (1887).

On the Marine Mollusca of Eastern Canada. Whiteaves. Can. Nat. Vol. IV. (new series). Art 6.

ECHINODERMATA.

The Echinodermata of New Brunswick. W. F. Ganong. Bull. N. B. Nat. Hist. Soc. No. 7, pp. 12-68.

Stimpson's Synopsis of the Marine Invertebrata of Grand Manan. (Smithsonian contributions, Vol. VI. (1854).

SPONGES.

Nova Scotian Fresh Water Sponges (a synopsis). MacKay. Proc. Inst. Nat. Sci., N. S. Vol. VI., Part 3, pp. 233-240 (1885).

Fresh Water Sponges of Canada and Newfoundland. Transaction Royal Society of Canada, 1889.

Some Marine Sponges. Honeyman. Proc. Inst. Nat. Sci., N. S., 1888, and series of articles in *Presbyterian Witness*, 1889.

CRYPTOGAMIC BOTANY.

Diatomaceæ of Nova Scotia. Preliminary observations with a list of recent and fossil—MacKay. Canada Record of Science. Vol. I., No. 4, pp. 236-244 (1885).

Marine Alga of N. B. and N. S. Hay and MacKay. Trans. Roy. Soc., Can. Sect. IV., 1887, pp. 167-174.

Lichens of Nova Scotia. MacKay (classified catalogue). Proc. Inst. Nat. Sci., N. S. Vol. V., Part 3, pp. 299-307 (1880).

Fungi, Mosses and Ferns of Nova Scotia. Many papers in Proc. Inst. Nat. Sci., N. S. and elsewhere, by Somers, Ball and MacKay, Burgess and Macoun.

PHENOGAMIC BOTANY.

Preliminary Catalogue of Plants of N. B. Fowler. Bull. N. B. Nat. Hist. Soc., No. 4, 1885, pp. 8-84, with later additions by Hay, Brittain and Vroom.

Catalogue of Nova Scotian Plants. Lindsay. Proc. Inst. Nat. Sci., N. S. Vol. IV., Part 2, pp. 184-223. (1875); also, in same proceedings at different date, papers by Lawson, How, Hardy, Somers, etc.

Revision of Canadian Ranunculacea. Lawson. Trans. Roy. Soc., Can. Sec. 4, 1884, pp. 15-90; also several other monographs by the same in the Trans. Roy. Soc., Can. and elsewhere.

Catalogue of Canadian Plants. Macoun. Geol. and Nat. His. Sur. of Can. Parts I., II., III. and IV., (exogens and endogens), published up to date.

GEOLOGY, ETC.

Acadian Geology. Dawson. With numerous subsequent geological and palaeontological, publications. In New Brunswick numerous papers, etc., by Matthew, Bailey and others; in Nova Scotia, Honeyman and others. Published in Provincial, Canadian and foreign journals, reports, etc.

(Concluded next number.)

FERNDALE SCHOOL.

No. XXIII. Birds of the Atlantic Provinces and their Feet.

T. Well, what was to be our lesson to-day?

S. You promised to tell us how many kinds of birds were to be found in Nova Scotia, New Brunswick and Prince Edward Island; so that when we see a bird we may know to what kind it belongs.

ANOTHER S. And so that we may know how many of them we know and how many we don't know.

T. Well, I will try to. I will give you the fifteen orders of birds I referred to the other day—not the big, Latin names, only easy English names; but we will follow the plan of the American Ornithologists' Union strictly.

S. What is the American Ornithologists' Union?

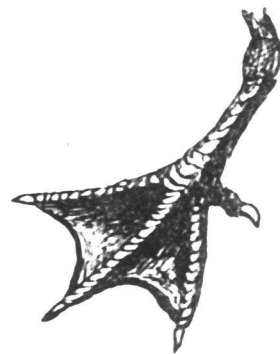
T. It is a society formed of people who know most, study most and write most about our birds; and when these people agree to change the old way of classifying birds, we have good reason to think their way is the best.

S. Does *order* mean a *family* of birds?

T. Not altogether. An *order* includes several families.

Now the first *five* orders of our birds are swimmers. And as the feet are used in swimming, I shall call your attention to the principal different kinds of birds' feet, at the same time.

In the 1st, 2nd, 3rd and 5th orders the *palmate* foot of these two kinds are very common. There is a membrane stretched from toe to toe which is called a *web*, and then the foot looks like the *palm* of the hand. Hence the word.



PALMATE FOOT

It will be noticed that in palmate feet the webs are attached to the toes up to the nails. In the second, not figured here, the web is deeply cleft. In a third kind, not figured here, the web is cleft up to the angle of the toes, leaving flaps or *lobes* of the web attached to the sides of the toes, forming what is called a *lobate* foot. These webs aid the birds in swimming.

Here, then, I write a table of the *orders* on the blackboard, giving the number of species which have at one time or other been found in the Atlantic provinces.

ORDER I.—DIVING SWIMMERS (fourteen species).

It includes three grebes, two loons, three puffins, one guillemot, two murre, two auks and one dovekie.

ORDER II.—LONG-WINGED SWIMMERS (twenty species).

This order includes one skua, three jaegers, eight gulls, one kittiwake and seven terns.

ORDER III.—TUBE-NOSED SWIMMERS (seven species).

This includes one fulmar, three shearwaters and three petrels.

The next order is characterized by a kind of foot called *toti-palmate*. It differs from the webbed feet of all other birds by having its *four* toes connected by the web. We



TOTI-PALMATE FOOT.

We might call them the toti-palmate swimmers, or

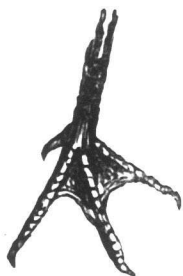
ORDER IV.—FULL WEB-TOED SWIMMERS (seven species).

It includes one tropic bird, one gannet, two cormorants, two pelicans and one man-o'-war bird.

Our next order includes our wild ducks and geese; and they are distinguished specially from other birds by having the inside edges of their bills furnished with transverse *lamels* or plates, which form a kind of fringe or strainer by means of which they sift the mud in which they generally seek their food. These lamels are on a larger scale in the mouth of the whale, in one species of which two hundred plates of "whalebone" lamels have been found on each side of the mouth, some of the largest being eight, ten or even fourteen feet in length. The fringed sheets of whalebone in the mouth of the whale appear also to have a similar origin and to serve a similar purpose to those of the birds in this order. It is a very curious point of relationship between such different classes of animals.

ORDER V.—LAMEL-BILLED SWIMMERS (thirty-five species).

It includes three mergansers, one mallard, eight ducks, one gadwall, one widgeon, one balpate, three teal, one shoveller, one pintail, one redhead, one canvasback, two golden eyes, one bufflehead, one old squaw, two eiders and three scoters (all wild ducks, thirty-one species), two geese, one brant and one swan.



SEMI-PALMATE FOOT.

The next three orders may be called *waders*. The *semi-palmate* foot is common among them, although by no means characteristic. Birds cannot be classed naturally according to their feet alone, any more than by their mouths. A number of points may have to be considered, and often there are cases where the jury disagree, and no wonder. Here, however, we have a semi-palmate foot, just to compare it with the cleft palmates.

ORDER VI.—KNIFE-BILLED WADERS (nine species).

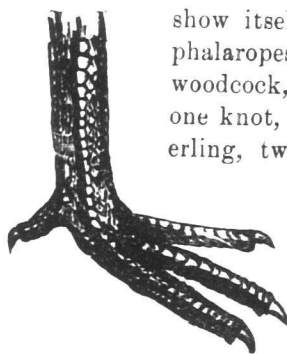
These are sometimes called *stalkers* from their habit of stalking stealthily about. The order includes one ibis, two bitterns, five herons and one egret.

ORDER VII.—LONG-TOED WADERS (six species).

Sometimes called *skulkers* from their timid habit. They pick up their food from off the surface of the ground and frequent marshy places. The order includes here two rails, one sora, two gallinules and one coot.

ORDER VIII.—SLENDER-BILLED WADERS (thirty-six species).

Called *stampers* from a common habit of stamping the soft mud in which they generally feel for their food in order to make their small prey show itself. The order includes two phalaropes, one avocet, one stilt, one woodcock, one snipe, one dowitcher, one knot, twelve sandpipers, one sand-erling, two godwits, two yellow-legs, one willet, one ruff, three curlews, four plovers, one killdeer and one turnstone.



RASORIAL FOOT.

Here is a sketch of a *rasorial* foot—one adapted for walking and scratching the earth to discover food.

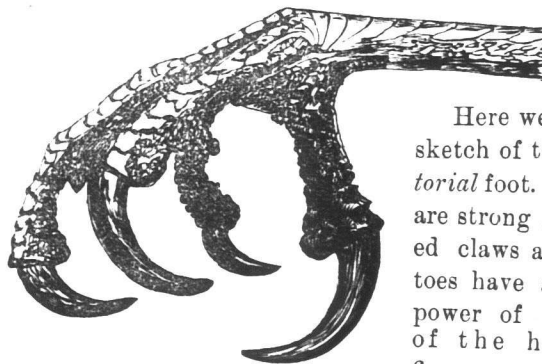
It is well represented in the following order:

ORDER IX.—TERRESTRIAL SCRATCHERS (two species).

Adapted for living on the ground. Includes the Canada grouse (spruce partridge) and Canada ruffed grouse (birch partridge).

ORDER X.—ARBOREAL SCRATCHERS (two species).

Adapted for tree life. The passenger pigeon and mourning dove (both rare).



RAPTORIAL FOOT.

Here we give a sketch of the *raptorial* foot. There are strong recurved claws and the toes have all the power of motion of the human fingers making it a perfect clutching apparatus.

ORDER XI.—BIRDS OF PREY (twenty-seven species).

The order includes two vultures (in New Brunswick accidental), ten hawks, one goshawk, two eagles, one gyrfalcon, one osprey and ten owls.

The next order is of curious composition—cuckoos and a kingfisher. They are so unlike that they might be put in different orders; but then, there would be so few in each. We sketch here the *syndactyle* foot of the kingfisher. "*Syn*," together, and "*daktylos*," Greek for finger. The outer and middle toe are in this case joined together for a distance.



ORDER XII₆—KINGFISHERS AND CUCKOOS (three species).

SYNDACTYLE FOOT. The belted kingfisher (very common), yellow-billed cuckoo and black billed cuckoo (rare).

The feet of the cuckoos are more like those of the woodpeckers, whose form of foot is called the *zygodactyl* or climbing foot, or the *zygodactyle* foot, from *zygon*," Greek for yoke. When grasping, two toes



ZYGOACTYLE FOOT (Woodpecker)

ORDER XIII.—YOKE-TOED CLIMBERS (eight species)

It includes six woodpeckers, one sapsucker and one flicker (all woodpeckers except in name).

ORDER XIV.—STRONG-WINGS (four species).

(a) Whip-poor-will and night hawk, (b) chimney swift, (c) ruby-throated humming bird.

Lastly we come to the greatest order of all—the perching birds. Their foot is called the *insessorial* or perching foot. The hallux or hind toe is capable of being opposed to any of the other toes, like the thumb of the human hand, and the muscles are so arranged as to tighten the perfect grasping hold of the toes on the perch by the weight of the bird itself. Sometimes this style of foot is spoken of as the *passerine* foot from the Latin name of the order, *passeres*.



INSessorIAL FOOT.

ORDER XV.—THE PERCHERS (102 species).

The order in these provinces includes in the *song-less perchers* eight, namely, one kingbird, one phoebe, five flycatchers and one pewee. In the *song perchers* ninety-four, namely, one lark, two jays, one raven, one crow, one bobolink, one cowbird, two blackbirds, one meadow lark, two orioles, one grackle, three grosbeaks, one finch, two crossbills, one redpoll, one goldfinch, one siskin, one snowflake, one longspur, fifteen sparrows, one junco, one towhee, one bunting, two tanagers, one martin, three swallows, two waxwings, one shrike, four vireos, nineteen warblers, one ovenbird, one water-thrush, one yellow throat, one redstart, one pupit, one catbird, one wren, one creeper, two nuthatches, two chickadees, two kinglets, three thrushes, one robin, one wheatear, one bluebird.

S. That is 282 different species of birds in the Atlantic provinces.

T. Yes. But some of these are very rare visitors—some even accidental. On another occasion I will give you the names of all the more common birds, and we shall see how near your list of local birds will come to it.

S. Some birds have only three toes, have they not?

T. The most of our birds have *four* toes, a few have only *three*. And I may mention that generally speaking the toes have the following number of joints: first toe, two joints; second toe, three; third toe, four; and fourth toe, five joints. There are a few exceptions in which the joints are one, three, four, five; or two, three, four, four; or two, three, three, three, instead of the normal, two, three, four, five. And, finally, note that the bird walks on its toes. The shanks drawn in our sketches, immediately above the toes, correspond to the instep bones of the human foot. The joint above corresponds to the heel. Its backward flexure shows this much. The joint corresponding to the human knee (with the forward flexure) is always hidden among the feathers of the body. The short thigh bone in the last order, and in addition the most of the leg bone below the knee joint in the first orders, are within the general skin-covering of the body. The bare shank, as we have seen, corresponds to the human *metatarsus*, but is generally spoken of as the *tarsus*; and the first joint above is the heel.

At Trontro on the Queen's birthday, the statue of the Rev. Egerton Ryerson, founder of the school system of Ontario, was unveiled. Among the addresses delivered on the occasion was one by Dr. Th. H. Rand, D.C.L. The pedestal of the statue is granite from St. George, in New Brunswick—a province which was the first early home of Dr. Ryerson's father and mother, after the close of the American revolutionary war. Dr. Ryerson's mother was a native of New Brunswick.

Plants in the Homes and in the School Room.

INSECTIVOROUS PLANTS.

The cut represents a curious plant which is very common in these Provinces—*Drosera rotundifolia*.



It grows on the borders of ditches, by roadsides, in swamps and in wet places generally. In June its round, reddish leaves may be observed, forming a rosette close to the ground. From the surface of each leaf there are numerous hairs or spines, bearing on their tips minute liquid drops which glisten in the sun like so many diamonds—hence the popular name of SUN-DEW, which has been given to the plant. But if these minute drops be examined, they will be found to consist of a glutinous substance wholly unlike dew. Later in the summer, in July or August, one or perhaps two scapes are sent up from the rosette of leaves, bearing a raceme of flowers. The plant when fully grown is not more than a few inches high. When first noticed early in June, its rosette of leaves, not more than three or four inches in diameter, lies close to the ground.

But this little plant has been talked about and studied closely by many naturalists; and if all that has been written about it and others of its class were gathered together, it would make a small library. These INSECTIVOROUS PLANTS catch and devour unwary insects. They lie in wait for these, and although they do not dart out and seize them their plans to secure their prey are no less sure and deadly. The drop of glutinous substance on each little hair or spine is sweet and attractive to the insect. Alighting on the leaf he makes his meal, but when he would retire he cannot. The more he struggles the deeper he is imbedded in the sticky substance, while the spines begin to enclose surely with a death-like grip. The sides of the leaf then begin to contract as is shown in the upper leaves of the drawing above, and at the expiration of a few hours the unhappy insect is enclosed in its living tomb. After the leaf has partaken of its meal, which may take a day or more, it gradually unfolds, and its traps are again set for another unwary insect.

This is no fancy sketch. You may dig up a plant, taking care to have plenty of earth attached, and expose in a saucer to plenty of air, for the plant derives its nourishment from these sources, while at the same

time it does not object to animal food. Take a small insect, or if your humane instincts forbid you impaling a black fly or mosquito on these deadly spines, a particle of raw beef about the size of a pin head will satisfy the plant's craving for animal food. Then watch the results.

Dr. Hooker, the eminent botanist, sums up the opinions on the *Drosera* by saying: "The repeated testimony of various observers spreads over a century, and though at no time warmly received, must, I think, satisfy us that in this small family of the *Droseraceæ* we have plants which in the first place capture animals for purpose of food, and in the second digest and dissolve them by means of a fluid which is secreted by the plant."

Another species of *Drosera* less common in these Provinces, has longer and narrower leaves than the one figured above. It is *Drosera Americana*, var. *longifolia*. It has the same blood-thirsty character as the round-leaved form.

The relatives of these plants which derive their nourishment in part, at least, from animal food are numerous. Very many plants capture insects but it is not yet certain, in many cases, that they use them for nourishment. Among the latter is the Pitcher Plant, *Sarracenia purpurea*, so abundant in bogs and wet places. The leaves of this family of plants—*Sarraceniaceæ*—which give them a character entirely their own, are pitcher-shaped or trumpet-like, and are collected in tufts springing immediately from the ground. They send up at the flowering season one or more slender stems, bearing each a solitary flower. The early English settlers in this country gave the plant the name of the *Side-saddle Flower* from the peculiar umbrella-like expansion in which the style or whole flower terminates. Another common name for it is the *Huntsman's Cup*, but ugh! no huntsman would drink the putrefying contents of one of those cups—the open sepulchres where myriads of insects are decaying in a polluted liquor and in a polluted atmosphere. At the top of these pitcher-like leaves there is a gaudy coloring and sweet juices, somewhat intoxicating in their nature, which tempt unwary insects to alight. Leading from this to the receptacle below are numerous hairs, all pointing downwards. The insect, feeding pleasantly and securely on the intoxicating nectar, wanders onward to the brink. If he would return it is difficult, for the hairs point downward, and he is in that happy, don't care mood that leads him to prefer the "primrose path." He reaches the brink and is carried to that "bourne" from which no insect traveller returns. Examine this Pitcher Plant and let the *Drosera* come in for a share of your attention. They are worthy of it.

ASTRONOMICAL NOTES FOR JUNE.

Short nights make June the worst month of the year for star-gazing. For the month as a whole, and for the Maritime Provinces generally, the average length of the night is only three hours. The length of daylight, twilight and night in the south of Nova Scotia and the north of New Brunswick for June 1st, June 21st and July 1st, is as follows:

SOUTH OF NOVA SCOTIA.

	June 1.	June 21.	July 1.
Daylight,	15 $\frac{1}{4}$ hrs.	15 $\frac{3}{4}$ hrs.	15 $\frac{1}{2}$ hrs.
Twilight,	4 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{2}$
Night,	4 $\frac{1}{4}$	3 $\frac{3}{4}$	4

NORTH OF NEW BRUNSWICK.

	June 1.	June 21.	July 1.
Daylight,	15 $\frac{3}{4}$ hrs.	16hrs.	16hrs.
Twilight,	5 $\frac{3}{4}$	6 $\frac{3}{4}$	6 $\frac{3}{4}$
Night,	2 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{3}{4}$

The long twilights are good enough for many of the star-gazer's most interesting objects, and daylight is quite sufficiently good for at least one of them.

This one is *Venus*. At the beginning of the month she rises one and three-quarter hours before the sun, and two and a half hours before at the end; and sets about the same time before sunset. She will be easily visible to the naked eye during June at any time between her rising and setting—even in the full blaze of noonday. But the eye must take some little trouble at first in finding out where to look for her. On the 1st she will be 35° W. of the sun and 11° to the South of him. On July 1st she will be 45° W. and 8° S. When you get your first noonday glimpse of her—and the nearer the 6th of June the easier this will be—note her position with respect to some convenient terrestrial object and then you'll have no trouble in finding her next noon. At the beginning of the month only a fourth of her disc is illuminated, at the end she will be a "half-moon." The naked eye won't show you this. But a large telescope is not needed. An instrument with a two-inch object glass and a power of forty is quite large enough. Less will do, but just how much less I don't know. If any of you know I wish you would tell me. If you have an instrument that will show the phases you needn't get up before sunrise to use it. You can have a better view after sunrise than before.

Jupiter is in Sagittarius near the handle of the Milk Dipper. At the beginning of the month he is near Lambda Sagittarius the middle star of the handle. Near the end of the month he will be on the handle and half-way between Lambda and Mu. On the 1st he rises about 9.20 p. m. (mean time), and about four minutes earlier each succeeding night. He is at his

best for this year during June and July, and so gives a good chance for a sight of his moons. All four of them can easily be seen with such a glass as that mentioned above. But almost any kind of a glass will show at least one. The easiest one, as a general rule, is the third (III). This one will be well placed for observation on any evening after the middle of the month except the 22nd and 29th. The best evenings for it will be the 20th, 24th and 27th.

Saturn is past his best for this year but is still a conspicuous object between Regulus and the Beehive, moving slowly towards the former. Its motion during the month will be about five moon-breadths. Note his position in a glass with respect to the small stars near him, and in a few evenings his motion will be quite sensible.

Uranus may be seen with a good naked eye on any clear night in June when the moon is not too bright and the street lights don't interfere. He is in line with Spica and Theta Virginis, much nearer Theta—so near that Uranus and Theta are easily in the field of an opera-glass. Until the 25th he is moving nearer Theta, after that away from it; but his motion is very slow, its total amount for the month being less than half the breadth of the full moon.

Mercury will be too difficult an object to catch during June, although at the beginning of the month he will be above the horizon for over an hour and a half after sunset.

Mars is too far off, too faint, and too near the sun. He will be of little interest to any one on the earth for the next three months at least. But just wait until next June.

The *Moon* will go her usual round this month, occulting the usual number of small stars. An eclipse and a couple of planetary occultations are also on the programme, but not for our corner of the globe. On the 14th she will occult Jupiter, but Mexico and the adjacent regions will get the benefit of that. On the 24th she will occult Venus, but to see this well one would have to be out on the southern ocean between the Cape of Good Hope and the Antarctic Circle. On the 28th she will eclipse the sun (an annular eclipse), but it will be for the benefit of South Africa chiefly. Before the end of the year our provinces may come in for a small share of these entertainments.

C.

PROFESSOR BROOKS, director of the Smith Observatory, New York, has obtained several observations of the new white region on Saturn's ring, and announces his discovery that the light is variable and that pulsations of the light at irregular intervals have been detected by him. This evidence of a change in Saturn's system is of the highest scientific interest.

For the EDUCATIONAL REVIEW.]

Foreshadowed Changes.

I noticed with pleasure the appearance of "Foreshadowed Changes" in the last REVIEW. I think they do not go far enough.

The Course of Study for High Schools is adapted to the wants of those who wish to prepare for College; it is also adapted for those who will not pursue their studies beyond the High School; but as it differs so much from the syllabus for Teachers' Licenses, those who wish to prepare to teach must experience neglect.

It is proposed that the awards of the Annual Provincial Examination be merely certificates of scholarship. I would like to see the High School Course take the place of the syllabus now in use, and the three grades of certificates be for the three years respectively. No restriction need be put on the age of candidates, but it might be made compulsory that applicants for the highest grade certificate be holders of the second grade certificate. This would raise the literary standard of teachers of the three grades. If applicants for the highest grade be exempted from the proper work of the second grade, they would have more time to devote to advanced work in their grade. The standard of the second grade would be advanced in the subjects of English, History, Science or Classics; while that of the third grade would be raised in every subject but Algebra.

To obtain professional qualification of the lowest grade, the age limit might be as at present, and an optional course in Didactics be given in the first year; but for the other grades, let there be Normal School training, with a certain age limit. If a lack of teachers should result, some modification might be made, such as suggested.

These changes would enable the Normal School to do better work, and the rank and file of our teachers would be better, both professionally and in their literary qualifications. Neither the regular High School pupils, nor those trying for licenses would necessarily be neglected.

Some who pass through the High School at an early age might under such conditions be induced to become teachers, whereas now they are practically prohibited.

The educational authorities would have to designate the optional subjects to be taken in each year, thus doing away with options in the High School, in my opinion, a change in the right direction, often made by the teachers.

This would also make the school year end at the summer vacation, and make it necessary to have the entrance examination just before the vacation. If a

second entrance examination is required in the year it might take place before the Christmas vacation. This would do away with the period now found after vacation, when long, tedious reviews make work drag. New work should be taken up at such a time. Also the crowded state of the schools before vacation and the small schools immediately after, until November, would be a thing of the past.

There would be the work of only one year between the various grades, and we would see more trying to obtain an advance in grade. We would also see persons starting out with the highest literary qualifications, and passing through the other steps to the highest professional qualifications.

These are some few reasons, which I think must appeal to all who are in the work, and receive their endorsement. If any one thinks these reasons are not sufficient to demand such changes, let him say so.

Yours truly,

Nova Scotia.

H. F.

Selected for the EDUCATIONAL REVIEW.]

Intelligence and Courage of Dogs.

A gentleman connected with the Newfoundland fishery had a dog of remarkable intelligence and fidelity. On one occasion a boat's crew in his employ were seen to be in circumstances of great danger. They were near a line of breakers, outside of the harbor, over which the waves were dashing in great fury. The danger of passing those breakers was so great that the men, brave as they were, did not dare to attempt it. A crowd of people stood watching them on the shore with great anxiety, but could do nothing to help them. Much time had passed and the danger was increasing every moment.

Standing with the people on the shore was the fishery master's great Newfoundland dog. He seemed to understand what the danger was. Presently he ran to the water, jumped in, and swam towards the boat.

He soon made his way through the surf and the men in the boat saw him coming near to them. At first they thought he wanted to get into the boat, but it soon became evident that that was not his purpose. He did not come near the boat but kept swimming round it. While doing this he looked earnestly at the men and would whine from time to time. The men wondered what he wanted. At last one of them cried out "Give him a rope, that's what he wants!" The rope was thrown, the dog seized it in his mouth, and then turned round and swam towards the shore. The men waiting there took hold of it and began to pull it in, and in a short time the boat, with its crew, was hauled through the dangerous surf, and the men on

board of it were landed safely on the shore. And so the lives of the boat's crew were saved by the intelligence of a noble dog.

Carlo was a very brave dog, belonging to one of the leading citizens in a New England town. He was very much thought of both by his master and all who knew him. An intimate friend of his master gives this account of him:

Carlo was in the habit of attending all the fires in the town. He could mount a ladder like a fireman, and I remember his adventures with great interest.

Once, on a public holiday, there were but few people about, as most of the citizens were absent on a popular excursion. Towards the close of that day the bells of the churches began to ring very loudly, as they always did when there was a fire. Carlo had been guarding the house and sleeping lazily. As soon as he heard the bells ringing he knew that there was a fire. Starting suddenly up he gave two or three loud barks to summon his master, and then started off as fast as he could run for the fire. On arriving there he went to work at once, and busied himself very usefully all the time, dragging downstairs with great speed and care articles of every description.

As the last house in the row was burning the cry of a child was heard in the upper storey. It was impossible for any one to make his way up the stairs and expect to get back. Carlo had heard the child's cry and seemed to take in the situation at a glance. Knowing in his dog's mind that the lower storeys were all in a blaze he rushed to the ladder, climbed hastily up till he reached the third storey, and then jumped in through the window. The fire and smoke soon drove him back to the ladder. His master saw him at that moment and shouted to him to try again, and the people cheered him loudly. He evidently understood what his master had said, for he entered the window again and disappeared for some time. Then the anxious people began to give up all hope for Carlo or the child. But finally a loud shout announced his appearance again, bringing the child with him. He managed to get on the ladder. He was terribly burned. Before reaching the ground he fell, still holding on with wonderful firmness to the little child.

The child was not much hurt, but poor Carlo's injuries were fatal. Every possible care was bestowed on the brave dog, but he died the next day.

What a noble example of courage and self-sacrifice.
St. John. E. M. S.

A wide-awake teacher will not let a day pass without repeated lessons in politeness and etiquette. He may not give it this term or name, but it will be so woven into his class illustrations as to carry the lesson in such a way as to give offence to none, and yet be observed and remembered by all.

N. S. Summer School of Science.

The following suggestions are for the benefit of those who have not yet attended the Summer School of Science:

Commence the study of one subject in Natural Science *at once*. With text-book, microscope and scalpel, collect, examine, classify, experiment, study.

ZOOLOGY. Text-book—*Colton's Zoology*.—Study the specimen—size, color, form, parts of body. Compare with other specimens, note resemblance and differences—habits, useful or injurious; dissect it, examine its parts—head, legs, wings, body, heart, lungs and other organs, draw a diagram of it. Collect a few specimens—classify and mount them.

BOTANY. Text-book—*Gray's How Plants Grow*. Study the text-book and the specimen. Collect a few common plants found in your neighborhood—classify and name them by the use of the key. Draw a diagram of each plant and its parts.

PHYSICS. Text-book—*Gage's Introduction to Physical Science*, preferable to Canadian reprint of Aultin's *Physics*. Perform every experiment; make your own apparatus; record results in note-book; verify all conclusions.

CHEMISTRY. Text-book—*Williams' Introduction to Chemical Science*. Study the text-book. *Experiment*. Many of the experiments may be performed with home-made apparatus. EXPERIMENT.

PHYSIOLOGY. Text-book—*Blaisdell's "Our Bodies and How we Live"*. Heath & Co. Study the text-book. Examine and dissect heart, lungs, eyes and other organs of some animal. Draw diagrams of them. Study the effect of the proper position of the body, ventilation, food, narcotics and alcohol on the general health.

ASTRONOMY. Text-book—*Recreations in Astronomy*, by H. W. Warren, D. D. Published by Chataqua Press, 80th Broadway, N. Y. Belcher's *Almanac*, 1889. Study the text. Name, locate and map a few star groups.

GEOLOGY. Text-book—*Shaler's First Book in Geology*. Study the text-book. Observe carefully the action of water in the brooks in your neighborhood, in wearing away earth in one place and building up in another. Collect, classify and name specimens found in your own locality, such as sand, soils, shales, slates, sandstones, conglomerates, fossils, etc. Form small cabinets for the purpose of exchange.

MINERALOGY. Text-book—*Crosby's Common Rocks and Minerals*. Study the text-book. Collect specimens from the neighborhood, classify and name them as far as possible. Form small cabinets for the purpose of exchange.

Any person requiring suggestions or direction in the study of any one of the above subjects may correspond with the Instructor of that subject or with the President.

EXAMINATIONS, CERTIFICATES, PRIZES AND GENERAL ARRANGEMENTS.

Before the close of the school in each year, each Instructor will hold an examination in the subject of his department, and to those who undergo a satisfactory examination a class certificate will be awarded, signed by the Instructor, President and Secretary.

For examination purposes, the work in each Natural Science 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., in the laboratory; (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 best method of teaching physics and chemistry.

At a public meeting recently held by the citizens of Parrsboro, it was unanimously resolved that four lecture rooms be fitted up as class-rooms, and the rink for public meetings. In addition to this a sum of money was voted to procure chemical and physical apparatus. Parrsboro affords ample hotel accommodation for all visitors. Any information concerning board will be cheerfully given by Principal Craig.

BOOKS. Papers and requisites for those attending the school may be obtained at the Parrsboro bookstore.

EXPENSES. To defray expenses a tuition fee of \$3.00, payable in advance, will be charged. One dollar extra will be charged to those who take the course in elocution.

BOARD. Good board may be obtained for \$3.00 per week.

REDUCED FARES. It is expected that reduced fares will be secured on all railways and steamers by persons attending the Summer Science School.

APPLICATION. It is very desirable, to facilitate further arrangements, that persons intending to be at the Summer School of Science should make application to the Secretary at an early date—not later than June 1st.

For further information address the President, Instructor or Secretary.

J. B. HALL,
Secretary.

Truro, N. S.

How to Interest Pupils in Natural Science.

We condense from a valuable paper, read to the teachers of York County by Prof. L. W. Bailey, Ph. D., of the N. B. University, some excellent hints on the practical teaching of Natural Science. After noting the great advances in this subject here and elsewhere, and the increasing interest in it, he said:

"When present at the annual examinations of the public schools, I have oftentimes been struck with the great contrast, as regards intensity of interest, on the part both of the pupils and the audience, in the first and second grades, where object teaching plays so conspicuous a part, and that of the higher grades, which deal so largely with mere abstractions. It is the practical recognition of these facts, and the continuation of the natural method of teaching which they suggest, which gives to the kindergarten system at once so much interest and value. But why should this system be confined within such narrow bounds? We are all but children in view of the stupendous realities of nature, and the whole world is but one great kindergarten, boundless in its resources, infinite in its variety, and never failing to afford profit as well as recreation to all who would approach her in the right spirit. Permit me briefly to indicate, in a very simple way, some of the paths in which, as it seems to me, her treasures may be sought even by the young, and in connection with ordinary school work."

Dr. Bailey proceeded to show how geography might be made a living study instead of the dull and profitless exercises too frequently given to pupils, by requiring them to memorize portions of text-books. Their observing powers should be quickened by drawing their attention to physical features of their neighborhood, encouraging them to draw maps, and to notice the natural forces at work in the past and at present in forming valleys, hills, plains, etc. Especially may pupils be led to take an intelligent interest in the physical phenomena constantly occurring, which would make geography a study of life-long interest.

"Finally, useful enquiries may be originated of a semi-botanical or semi-zoological kind. As to the distribution of our native plants, the comparative abundance or rarity of different species, their different places and habits of growth—some in shady woods, others in open fields, some on dry hillsides, and others by the sides of water courses, some flourishing on banks of sand, and others again only in

the fissures of rocky bluffs; or, in the case of animals, the times of the first appearance of common birds and the changes in their plumage, the ravages of noxious insects, the habits and metamorphoses of insects; the distribution of peculiar forms, such as the cray-fish or the mole, the nesting of birds, the habits of fishes, etc. All of these are subjects in which even the young may be led to take an intelligent interest.

And if we pass to higher grades, would it not be easy to show that the changes which are now going on every where around us, by the action of water, and ice, and frost, and air, by winds and waves, and tides and currents, have similarly been going on through indefinite periods of the past; and that though the effects, in a limited period, may seem altogether insignificant, in time they become very appreciable and are the means by which the whole earth has been to a large extent fashioned and fitted for its purpose as the abode of man. Seeing for example how water transports and at the same time wears and sorts the materials subjected to its action, how the banks and beds of streams are composed of rolled pebbles of sand or clay according to the varying velocity of the current, how these same materials are deposited in the successive and alternating layers as the results of changes in the channel or the effects of freshets, and how, at times, various objects, as metallic implements, drifted logs and leaves, shells, or even the bones of animals may become embedded in such deposits, the student of nature will probably find no difficulty in seeing that much of the material constituting the earthy banks of streams and rivers are of precisely the same character, arranged in the same way, and often holding the same sort of relics, though these, like the intervalles of the St. John, and that on which Fredericton rests, are now very rarely, if ever, reached by running water. Thus he will learn that large as some of our rivers may even now seem to be, they formerly flowed in far wider channels and were subject to overflows of which we can hardly estimate the magnitude. Then going still farther back, from the intervalles to the hillsides, and looking at the rocks laid bare by the course of some stream or by the opening of a quarry, he may see that these, too, are composed of rounded pebbles or of sand, hardened and compacted, it is true, but yet unmistakable in their character, and when long exposed to the weather, crumbling back again into their original condition. He thus finds that the hills, too, are largely made of water-formed rocks, and accordingly point to some former past condition of the surface widely different from that with which he is familiar now. In these, too, if he search with sufficient diligence, he may find relics which he will not doubt are relics of former living beings, it may be a stranded leaf, or a log, or a shell, and if these differ, as they probably will, in details of form and structure from those with which he is acquainted, he will be naturally led, as others have been before him, to the inference that the population of the world has changed, and that various kinds of plants and animals which were once abundant on its surface have now disappeared. Knowing, too, something of the kinds of animals which naturally frequent fresh and salt waters respectively—common snails and insects for example as compared with oysters and clams and whales, and finding, as he may do in many parts of the

province, rocks filled with remains of salt water forms, corals and shells and crustaceans, he will accept the conclusion as inevitable that these too once lived in the sea, and that old ocean once rolled over the spot where they now lie buried, though that spot may be scores of miles from the present sea coast, and hundreds of thousands of feet above its present level."

But some one may be disposed to say, "Where is the time to be had for all this sort of thing?" Now, in answer to this, if you will look carefully at what I have said, you will see that it makes no drain at all on ordinary school time. It is work to be done not in the schools, but outside of it, work in the open fields, in the flower decked woods, by the running brooks, and around the borders of lakes and rivers, work which will be done in any case so far as the visiting of these is concerned, but which it is only proposed shall be done intelligently. So far as the school itself is concerned no more time need there be consumed than what is needed for an occasional comparison of results, the correction of wrong conclusions and the suggestion of new directions for effort. Indeed such work may be made to assist rather than to interfere with the prosecution of other school work. For example, what better or more suggestive topic can be given for a school essay or literary composition than that of the description of the natural features of a landscape? What better illustrations can be given of geometrical forms and mathematical symmetry than are afforded by the crystals of familiar substances, of ice and snow, of sugar, salt and alum? What better means of developing the artistic talent and of encouraging a taste for drawing than are afforded by the natural models of trees and shrubs and flowers? What better methods, as I have already said, of interesting pupils in the facts of physical geography than by pointing out their illustrations in the local features of the district in which it is taught? Or what more forcible comments on the facts of history—modern history at least—than are suggested by the names of familiar places or the occurrence of old landmarks, the marks of former struggles for supremacy, the relics it may be, like the scattered arrow heads and stone axes often found scattered over the fields or turned up by the plough, of the former occupation of the country by peoples or races now extinct. To sum the whole matter up, in the words of an old friend and distinguished teacher, who himself did no small part in bringing about the result to which he refers: "The studies of the school, occupying the child with widely different though indispensable tasks, have, until within a few years, failed to provide the young mind thirsting for a knowledge of nature with any opportunity of useful communion with her works. But thanks to the wiser views of our contemporaries, the doors of the academy and the high school are thrown open to admit the odorous breath of flowers, and the melody of birds and the free air and sunshine of the teeming vocal beautiful world, and it is found that the clear refreshing atmosphere, instead of dwarfing the plants of classical and mathematical learning, only nourishes them to a healthier and more vigorous development."

EVERY school in the Dominion should have in it as first essentials the entire Bible, the British flag and an unabridged dictionary.—*J. Robb in Toronto Educational Journal.*

The Zodiac in the Catacombs.

"The prevalence of fish forms," says the St. John EDUCATIONAL REVIEW in the answer kindly accorded to our zodiacal enquiries; "in the ornamentation of Christian tombs in the catacombs of Rome is not likely to have any astronomical signification. The Christians of that time were not likely to have had good opportunities, or even the leisure to cultivate such tastes." We venture to think the REVIEW does not quite take into consideration all the conditions of early Christianity. The theories of the theosophists and mystics of to-day are pushed too far, and they are led away by their exaggerated estimate of analogy, especially in ascribing too much to the solar myth. Nevertheless, they have thrown much true light on the subject. The mass of the world was then Pagan, and that world was thoroughly imbued with solar and consequently zodiacal ideas, and it is well known that the Christian church adapted its festivals to this domination among many other means it used to justify its faith in the eyes of its Pagan fellow-citizens. It is also a fact which we take to be proved, that the more ancient religions were absolutely dominated by the sign in which the sun stood at the vernal equinox. The very idea of the "Lamb of God" was due to this rule, the constellation Aries having been sometimes called the Lamb instead of the "Ram," of which more hereafter. Many high authorities consider that the transfer of the equinox from Aries to Pisces, which was regarded as symbolical of the triumph of the principal of life over the powers of evil, and therefore applicable to Christ, was connected with this recession so definitely that the Messiah was sometimes actually styled the Fish as well as the "Lamb" of God. It therefore became a holy symbol appropriate to Christian tombs as the cross is considered now.—*Halifax Critic.*

DALHOUSIE COLLEGE.

The annual convocation of Dalhousie College took place in the Academy of Music, Halifax, on Thursday afternoon, April 25th. We have space only for the list of graduates and the winners of special honors.

BACHELOR OF ARTS

Allison, Edmund Powell, Halifax, N. S.
 Brown, Ernest Nicholson, Lower Newcastle, N. B.
 Burkitt, Robert James, Athenary, Ireland
 Davidson, James McGregor, Halifax, N. S.
 Fraser, Alexander, West River, Pictou Co., N. S.
 Fraser, John Keir Geddie, Alberton, P. E. I.
 Frazee, Victor Gladstone, Dartmouth, N. S.
 Fulton, Edward, Lower Stewiacke, N. S.
 Harvey, McLeod, Newport, N. S.
 Henry, Joseph Kaye, Shubenacadie, N. S.

Laird, Arthur Gordon, Charlottetown, P. E. I.
 McDonald, Robert James, Hopewell, N. S.
 Paton, Vincent, Halifax, N. S.
 Putnam, Homer, Lower Onslow, N. S.
 Smithers, Allen, Halifax, N. S.
 Stewart, Frank Ingram, Charlottetown, P. E. I.

BACHELOR OF LAWS.

Campbell, Alexander, Sydney, C. B.
 Campbell, John A., Truro, N. S.
 Cummings, Selden Wm., Truro, N. S.
 Forsyth, George Ormond, Greenwich, N. S.,
 Lovett, Henry Almon, Kentville, N. S.
 McNeill, Albert Howard, Charlottetown, P. E. I.
 Paterson, George, New Glasgow, N. S.
 Ross, Henry Taylor, Halifax, N. S.
 Tobin, Thomas Finlayson, Halifax, N. S.
 Whitford, Joseph Arthur, Bridgewater, N. S.

PRESENTATION OF HONORS.

Classics: First rank, A. G. Laird
Mathematics and Physics: Second rank, R. J. Burkitt.
Mental and Moral Philosophy: First rank, A. Fraser;
 second rank, E. N. Brown.
English and English History: First rank, Edward Fulton.

MEDALS TO BE PRESENTED.

Governor-general's gold medal, to A. G. Laird; Demill gold medal, to Edward Fulton, presented by president of Alumni Association; Certificate of Short Course in Arts, to Miss Elizabeth H. Stewart.

SPECIAL PRIZES.

The Waverly Prize, C. L. Moore; the Avery Prize, J. K. Henry; the Early English Text Society's Prize, Edward Fulton; the New Shakespere Society's Prize, Miss E. H. Stewart. Valedictory address for graduating class in Arts, by Victor G. Frazee, B. A. Valedictory address for graduating class in Laws, by George G. Paterson, LL. B.

Spelling Reform.

INTERNATIONALITY.—We have several times heard it expressed, How well it would be to have a common alphabet to denote European tongues, especially German, French and English. Such a one will allow comparison of sounds approximately the same. The *Paris Teacher* has been for nearly three years giving samples of English, German, French, Italian, Swedish and Danish, but with alphabets not entirely uniform. With 1889 this has been changed, the same alphabet being used, except for three nasalized vowels for which typographic forms (*faute de caracteres*) are not yet ready. We consider it useful to compare pronunciation, and thus reach comparative orthoepy. With the alphabet itself apart from this use we are not in love. The question it sets about solving is to revise and enlarge the Roman alphabet consistently, so far as may be, with current use of letters by nations

now using the unrevised alphabet. It allows correspondents to use what pronunciation they prefer in each tongue, which makes its pages material for study by every one having interest in (even one, as English, or more) modern languages. In English its orthoepy is too colloquial to our notion, yet gives fair average orthoepy for our tongue, with close *e* and *o* considered diphthongs (*ei*, *ou*). The best way to get it is to become a member of the "Fonetic Teachers' Association," of which the headquarters are at 6 Rue Labor-dere, Neuilli-Sur-Seine, France. Ordinary members pay two francs a year and get a copy monthly free. Active members pay five francs (\$1) and get three copies.

So says the *Herald of Spelling by Sound*, Toronto, and so say we.

A BAD SPELL.—A clerk wrote out a cheque for \$40, spelling it "f-o-u-r-t-y." His employer directed his attention to his error, remarking, "you seem to have a bad *spell* this morning." The clerk replied, "Sure enough, I've left out *gh*."—*Toronto Herald*.

No, it is not. There is, consequently, a steadily increasing number of educated people who reject alien spelling in program, epigram, coquet, filosofy, etc., and spell them as they ought to be spelled.—*Chicago Tribune*.

To the Teachers of District No. 10.

Our Nature Lesson work for summer will be Botany. Helps: "How Plants Grow," EDUCATIONAL REVIEW, and hints in Cumberland and Truro papers.

May.—Plant seeds in boxes, as Beans, Corn, etc. Give simple lessons on leaves and flowers while seeds are germinating. Examine seeds at various stages of growth. When up, show differences between the two great classes, as illustrated by Beans and Corn. See REVIEW for March and April, and "How Plants Grow." Chap. I., Sec. 2 and 119-131.

June.—Complete lessons on Leaves, Stems and Flowers. Begin about the 20th to talk about classification from Grade V. up, using the simpler plants of the season. Alternately with these have simpler talks with small pupils, as going more carefully over May work, or object lessons designed to get children to trace differences in leaves, flowers, stems, etc. Sec. 143-148, 191-197, and Chap. IV.

July.—Dandelion, and other flowers of Sunflower F. examined. Chap. IV. For Dandelion see page 164.

August.—Review, with continued lessons in classification, and study of the season's flowers. Chap. IV. and key with larger ones.

September.—As in August. Smaller pupils bring in leaves of our various trees, point out differences and make collections in scrap book, printing names underneath. Larger ones might make collection of the woods. All study cones of fir, pine, etc.

October.—Fruits and Seed, uses of plants. Chap. II., Sec. 4 and Chap. III.

Three lessons a week all summer; remaining days choose your own nature lessons. Length of lesson, about ten minutes. Wishing you all success.

Sincerely yours,

E. J. LAY.

Amherst, N. S.

EDUCATIONAL OPINION.

Two distinct lines of study not directly professional, deserve to be emphasized in a normal school curriculum. These are Natural Science and Literature. It would be quite out of place to enlarge on this view here, but independent of their practical utility, these studies have a special disciplinary value for the normal school student. They seem to be counterparts of each other,—things and thoughts, nature and man, truth and inspiration.—*Principal Calkin, N. S.*

I DESIRE to bear testimony to the value of the EDUCATIONAL REVIEW among our teachers. A large number of them, however, have not subscribed for it as yet. This neglect on their part is their mistake. It is also, in one sense an injustice to those whose enterprise has placed this comparatively new journal in the front rank of teachers' helps.—*Inspector Oakes, N. B., now Principal Horton Academy.*

ANNUAL should supercede the present semi-annual engagements between teachers and trustees. It is most desirable that the same school should be officially visited twice in the year—the first visit to be made early in the session and the second later on, to note evidences of progress and to see if the suggestions made during the previous visit have been adopted. To give completeness to the system the semi-annual reports of accredited visitors should be invested with more importance than they now receive. Suggestions of an advisory character are not so apt to be acted upon unless it is understood that non-compliance may be visited with the penalty of withholding, in whole or in part, appropriations from the Provincial and County Treasuries.—*Inspector Gunn, N. S.*

IN estimating the quality of the work done it is somewhat difficult to note minutely the ratio of progress from term to term. So much depends upon the teacher, and good teachers, who are capable of working up the intellectual life of dull and sluggish

children and arousing an enthusiasm for study are scarce.—*Inspector Condon, N. S.*

THE best schools are those whose teachers and trustees conform as nearly as possible to the law and regulations of council. The schools that show the least results for the time and money expended, have no definite aim and follow it. I am impressed more and more with the wisdom of having a definite curriculum of studies for all the studies of the public schools, and believe it will tend to advancement to compel all the government schools to adopt such a course as a basis of work. There are schools—and I regret to report it—that do not attempt the “Oral Lessons” required. I have made a minute of all these cases, and find they include nearly all of my poor teachers. They say they cannot teach these lessons, and I suppose they are more than half correct. Any one can hear children read and recite lessons from a book; but those who *think* and *study* can give good oral lessons. Want of time is the excuse given by those neglecting this kind of work; but they find time to attend to much other work not required of them. It is my present intention to make the oral work a specialty in my inspection for a few terms. I do not wish to undervalue text-book work, but I desire oral instruction to have its proper place in all the schools.—*Inspector Roscoe, N. S.*

PERSONAL NOTES.

Allan Pollock Douglas, Principal of the schools of Westville, has resigned to take a position on the staff of the *Enterprise* published in New Glasgow. He was presented with an address, field-glass and a purse. If any of our popular teachers leave the profession, we hope it may be for nothing less than a position on a popular newspaper. They then remain still public teachers; but their schoolroom becomes very much larger.

We acknowledge with thanks the receipt of a Baltimore paper from Wm. R. Fraser, Esq., B. A., describing the opening of the Johns Hopkins Hospital, one of the finest in the world.

Principal McKittrick, of Sydney Academy, has resigned to enter upon the practice of law. He was presented with an address and gold watch by the students and teachers of the public schools.

F. T. MacKeen, Esq., has been appointed Principal of the Sydney Academy.

Jas. C. Shaw, B. A., Classical Master in the Pictou Academy, has been appointed Munro tutor in classics in the University of Dalhousie.

Joseph Kaye Henry, B. A. (Dalhousie), has been appointed Classical Master in the Sydney Academy.

Professor MacGregor, of the University of Dalhousie, sustains the reputation of Canadian science creditably in his correspondence in the *New York Science*.

Professor Lawson, of the University of Dalhousie, ex-president of the Royal Society, has had an interesting article on the Trees of the Halifax Public Gardens in the *Morning Chronicle*, May 16th.

Dr. Honeyman, of the Provincial Museum, read a paper on the invertebrates attacking the Atlantic cables, before the Institute of Science of Nova Scotia. Harry Piers read a paper on the “Stone Age of Nova Scotia”—illustrated from the Provincial Museum.

SCHOOL AND COLLEGE.

Moncton, N. B., is to have a new school building to accommodate ten departments, with basement for playroom in stormy weather.

THE N. B. normal school students have collected a fund of \$50, with which to purchase the nucleus of a library.

QUEEN'S UNIVERSITY, Kingston, Ontario, closed on April 23rd. It is remarkable that the three valedictorians in arts, medicine, and theology respectively, were Nova Scotians; two of them Pictonians, and one a Pictovian. R. M. Phalen, an old Pictou Academy student, from Cape Breton, was the valedictorian in arts; Norman Grant, B. A., Stellarton, Pictou, in medicine; and C. J. Cameron, A. M., New Glasgow, Pictou, in theology.

The degree of A. B. was conferred on the following graduates at the recent closing of Mt. Allison University, Sackville:

William Ayers, Union Road, P. E. I.
 Benj. Hedley Balderston, North Wiltshire, P. E. I.
 Ephraim Rayworth Chapman, Port Elgin, N. B.
 Charles Comben, Petitcodiac, N. B.
 Levi Curtis, Blackhead, Newfoundland.
 Fred. Wm. W. DeBarres, Guysboro, N. S.
 Walter Daniel Irwin, Halifax, N. S.
 Heber Stockton Keith, Petitcodiac, N. B.
 Neil McLauchlin, St. Catherines, P. E. I.
 Thomas Benjamin Moore, Sackville, N. B.
 Wm. Wheelan Pascoe, St. John's, Newfoundland.
 Samuel Willis Prowse, Murray Harbor, P. E. I.
 Herbert Warren Sangster, Sackville, N. B.
 William Seaman, Minudie, N. S.
 Harry Almon Sheffield, St. John, N. B.
 Henry Star Theakston, Halifax, N. S.
 Thomas Augustine Wilson, Halifax, N. S.

BOOK REVIEWS.

HULMEAN LECTURES ON CHRISTIAN REUNION, by Rev. John deSoyres, A. M., Rector of St. John's Church, St. John, N. B. This is a neatly printed volume from the press of J. & A. McMillan, St. John, containing a series of four lectures delivered to the students of the University of Cambridge, England, in 1886. The literary excellence of these discourses and their broad spirit of religious tolerance should commend them to many readers on this side of the Atlantic.

PHYSIOLOGICAL NOTES ON PRIMARY EDUCATION AND THE STUDY OF LANGUAGE, by Mary Putnam Jacobi, M. D. The subjects treated in this interesting volume are: "An Experiment in Primary Education," "The Flower or the Leaf," "The Place for the Study of Language in a Curriculum of Education." This book will be a revelation to those interested in primary education, as showing what may be accomplished by rightly directed efforts and an attempt to understand the mind of a child. For sale by J. & A. McMillan, St. John, N. B.

THE CHORAL BOOK for Home, School and Church, translated by Friedrich Zuchtman, Principal of Conservatory of Music, Springfield, Mass., and Edwin L. Kirtland, Superintendent of Schools, Holyoke, Mass., U. S. A., (Boston, U. S. A. Ginn & Co., 1889). This volume of nearly 100 pages is dedicated to "Dr. Eben Tourjee, the champion of congregational singing." The topics are preeminently adapted for congregational purposes; and as the melodies are simple, and the typography perfect, it forms an excellent book for general vocal culture in school or elsewhere. The collection consists of ninety choice choral pieces which have proved their quality by centuries of use in the homes, schools and churches of Germany, the melodies being unchanged by a single note. The particular objects of the book are given as (1) The bestowal upon the home circle of music easily mastered, and containing means of the best musical culture. (2) The introduction to the school-room of suitable music for sight-reading, and for the devotional or musical exercises at opening or closing of the Sessions. (3) The restoration to the churches of the ideal music for congregations and the displacement of the light and lively *morceaux* of the opera, obviously unsuited to convey religious sentiment, and impossible of good rendering by untrained masses. (4) The matchless harmonies of these ninety tunes should serve to establish among people, or musicians, the elevated musical idea which was possessed by the masters who composed them and the people who loved them.

HANDBOOK OF RHETORICAL ANALYSIS, by John F. Genung, Ph. D.; Ginn & Co., publishers, Boston. The design of this book is to furnish materials as aids to the study of literary models. Selections are made from the best authors in English literature, accompanied by notes which are intended rather to elicit and direct study than as a body of information about the text. The book seems to be admirably adapted for those who would improve their style by a close study of excellent models.

HOMER'S ODYSSEY. Books I-IV., by B. Perrin. HOMERIC VOCABULARY, by Thomas D. Seymour, M.A. Ginn & Co., Boston, Mass., Publishers. These books, like their predecessor which we recently noticed, the "Hellenica," are beautifully and accurately printed and tastefully bound. In style of workmanship they are all we could desire, and worthy of the author and stimulative to the reader. The notes to the *Odyssey* are especially good. In general they are such as are calculated to assist the student without precluding effort on his own part. Real difficulties are met and solved in a scholarly manner, but still so as to be intelligible and interesting to the student at this early stage. Peculiar construction, allusions, words of Homeric form, etc., are annotated upon in such a manner as to show that the editor is not only well acquainted with Homeric literature, but that he knows how to make the knowledge available to assist the thoughtful student. We trust that it will be extensively used, for it has many of the features of an excellent class-book.

We cannot say that we have a partiality for vocabularies, either bound with the text or in a separate volume. The vocabulary before us, however, has genuine merits, and will be found helpful by the student. In the treatment of the proper names which occur, the derivations, the words in Latin which correspond to the Greek, the quotation and translation of idiomatic expressions, and in other matters he will find much assistance. But we cannot forbear remarking that though the memorizing of the parts of verbs is irksome to most students, and it may appear a more desirable method to confine the attention of the pupil to the parts which occur in the author, and thus give him the verb piecemeal, as it were. This method will, in the end, prove more irritating than the other was burdensome. We have long felt convinced that the more thoroughly the verb is mastered in the early stage, the more satisfactory is the progress in the latter, and that to accomplish this no assistance can compare with that rendered by Liddell and Scott's abridgment.

EXCHANGES.

The *Popular Science Monthly* for June contains several important articles, among which are "Fungi," "Fabulous Astronomy," "Is Christian Science a Craze?" and others. Published by D. Appleton & Co., New York, comes with a weekly summary of scientific news, record of inventions, and reading matter of general interest, with illustrations of the most important articles. *Garden and Forest*, D. A. Munro, publisher, New York, is doing an important and increasingly valuable work in arboriculture and gardening. Recent numbers have been especially interesting. *St. Nicholas* for June has a finely illustrated story of French Canadian life, the scene of which is laid at the village of Perce, Quebec. *The Forum* for June has very interesting articles on "The Drift towards Annexation," by W. Blackburn Harte, and "Languages in Modern Education," by Prof. J. S. Blackie. *Walden* for June is a beautifully illustrated and very readable number. *Germania* is a new fortnightly periodical for the study of the German language and literature, which is of great advantage to students. Published at Manchester, N. H. Subscription price \$3.00 a year.

Educational Institute of New Brunswick.

ELEVENTH REGULAR MEETING, TO BE HELD AT THE PROVINCIAL NORMAL SCHOOL, FREDERICTON.

JUNE 26th, 27th, 28th—1889.

Programme.

1ST SESSION, WEDNESDAY AFTERNOON.—Enrolment Election of Officers Report of Executive Committee. Other business.

2ND SESSION, WEDNESDAY EVENING. Public Meeting Address of welcome by the Mayor of Fredericton. Addresses by other prominent speakers Music by a special choir.

3RD SESSION, THURSDAY MORNING.—1. Paper on "The demand which the Common School is making on the Common School Teacher," by Eldon Mullin, M.A., Principal of the Normal School.

2. Paper on "Composition and Critical Reading versus the Formal Teaching of English Grammar," by George C. Hay, Ph.B., Principal of the Victoria and Girls' High School.

4TH SESSION, THURSDAY AFTERNOON.—Paper on "Compulsory attendance at School," by Frank H. Hayes, Superintendent of the Portland schools.

5TH SESSION, THURSDAY EVENING.—Paper on the question "Is the Common School meeting the demand for Practical Education?" by P. G. McFarlane, B.A., Principal of High School, St. Stephen.

6TH SESSION, FRIDAY MORNING.—1. Paper on "The Superannuation of Teachers," by S. C. Wilbur, B.A., Principal of High School, Moncton.

2. Paper on "A Programme of School work for Friday afternoon," by George J. Oulton, Master of Superior School, Dorchester.

7TH SESSION, FRIDAY AFTERNOON.—1. Paper on "Public School education—Its relation to the Political, Social and Moral tendencies of the Times," by Philip Cox, B.A., Principal of Harkins School, Newcastle.

2. Election of Executive Committee.

8TH SESSION, FRIDAY EVENING.—Paper on the question, "What provision might be made for Technical Education in the Province?" by W. S. Carter, M.A., Inspector of Schools, St. John.

Arrangements have been made for discussions to follow the reading of the several papers. The names of the leading speakers will be published later. There will be opportunity for the introduction of business at several of the sessions. The usual travelling arrangements will be made.

HERBERT C. CREED,
Secretary.

NOVA SCOTIA

Provincial Educational Association.

The next Annual Meeting of the PROVINCIAL EDUCATIONAL ASSOCIATION will be held in TRURO on Wednesday and Thursday the 10th and 11th of July, 1889.

A very full and excellent programme has been prepared for the occasion. Subjects of special interest at the present time have been selected and they are to be treated by able and successful educationists, viz.:

Some Phases of Modern Educational Progress, by D. Allison, LL.D., Superintendent of Education.

Our Common Schools, by Hon. D. C. Fraser, M. E. C., New Glasgow.

The Course of Study, by F. H. Eaton, M. A., Provincial Normal School.

"*Civics*," by Prof. Tufts, Cambridge.

Academy Diplomas, by George Miller, Esq., Hantsport High School, and N. C. James, B. A., Prof. Modern Languages, Halifax Academy.

Duties of Principals, by E. McKay, B. A., New Glasgow High School.

Transfer Examinations, by H. S. Freeman, B. A., of Amherst Academy, and A. Cameron, B. A., of Yarmouth Academy.

Kindergarten in the Primary School, by W. R. Campbell, B. A., Truro Academy, and Mrs. S. Patterson, Truro.

Music—Tonic Sol-Fa, by Rev. James Anderson, B. A., Musquodobit.

Arithmetic in the 1st and 2nd Grades, by Miss N. E. Church, Normal School Medalist.

Language in the 3rd-6th Grades, by Miss N. A. Burgoyne, Windsor.

A "Model School" class which had the advantage of a short course of training in the staff notation from the highly talented teacher of music in the Normal School, will exhibit the results of six weeks' teaching in Tonic Sol-Fa by Miss W. G. Crowell.

Sergeant-Major Bailey, Instructor in Calisthenics in Dalhousie College expects to exhibit a class which he is training specially for the occasion. His course has commended itself to competent judges as being very comprehensive and adapted to the requirements of the school room.

A Public Educational Meeting will be held on Wednesday evening. The Rt. Rev. the Lord Bishop of Nova Scotia and other distinguished speakers will address the meeting.

The usual reductions in Railway fares may be expected—free return tickets except in one or two cases in which the return is one-third.

A. MCKAY,
Secretary.

Halifax, May 20, 1889.

MATRICULATION STANDARDS IN CLASSICS

ADOPTED BY THE

COLLEGES of NOVA SCOTIA,

AND

Prescribed by the Council of Public Instruction as a Course of Classical Reading for County Academies and High Schools.

FOR 1890 (TO BE USED 1889-90.)

LATIN SUBJECTS:

(1) *Cæsar de Bell. Gall.*, Books II. and III.

(2) Virgil, *Æneid*, Book II.

For ordinary matriculation Dalhousie will accept either (1) or (2). In addition to (1) and (2) Acadia will require Cicero *Pro Archia*.

GREEK SUBJECT:

Xenophon, *Anab.* Book IV.

Dalhousie for Munro Exhibitions and Bursaries will require also Xenophon *Anab.* Books V. and VI.

LATIN PROSE COMPOSITION:

Bradley's *Arnold*, Exercises 1-44.

Dalhousie for Munro Exhibitions and Bursaries will also require *Greek Prose Composition* as in Fletcher and Nicholson (A. Baillie, Kingston, Ont.) Exercises 1-28.

FOR 1891 (TO BE USED 1890-91).

LATIN SUBJECTS:

(1) *Cæsar de Bell. Gall.*, Books II. and III.

(2) Virgil, *Æneid*, Books II.

For ordinary matriculation Dalhousie will accept either (1) or (2). In addition to (1) and (2) Acadia will require Cicero *Pro Archia*.

GREEK SUBJECT:

Xen. *Anab.* Book V.

Dalhousie for Munro Exhibitions and Bursaries will require also Xen. *Anab.*, Books VI. and VII.

LATIN COMPOSITION, &c.:

As for 1890.

McGILL UNIVERSITY.

MONTREAL.

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FACULTY OF ARTS—(Opening Sept. 16th, 1889)
DONALDA SPECIAL COURSE FOR WOMEN—(Sept. 16th).
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FACULTY OF MEDICINE—(Oct. 1st).
FACULTY OF LAW—(Oct. 1st).
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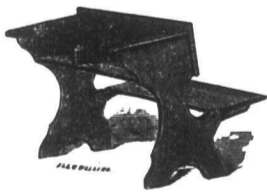
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