

# THE EDUCATIONAL REVIEW.

FOR THE ATLANTIC PROVINCES OF CANADA.

VOL. III.

SAINT JOHN, N. B., APRIL, 1890.

No. 11

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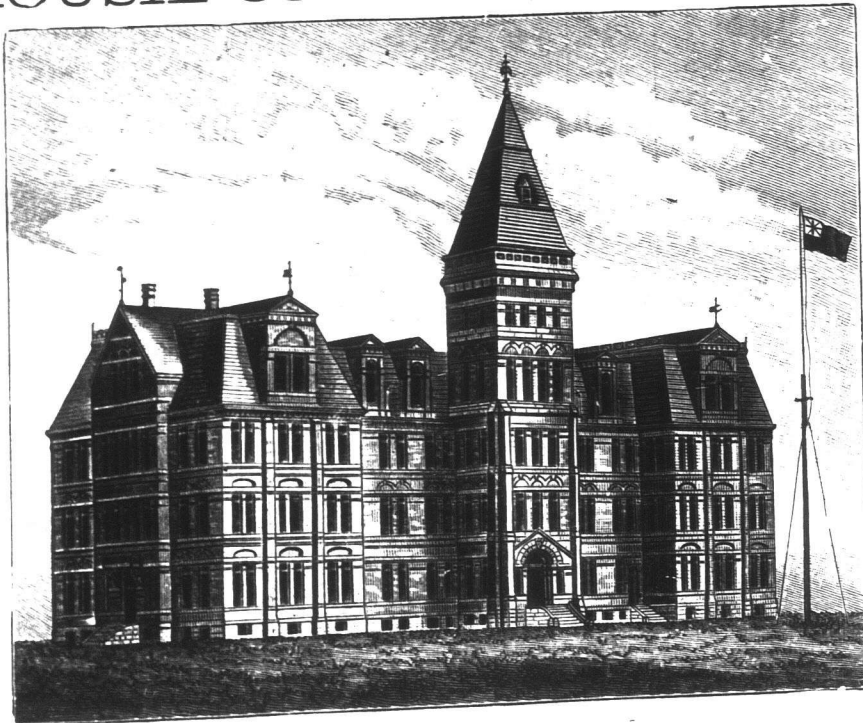
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# The Educational Review.

Devoted to Advanced Methods of Education and General Culture.

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The Educational Review is published about the 10th of each month. Any subscriber failing to receive it by the 20th should notify us of the fact. Subscribers wishing a change of address should give the Former as well as the New address.

## EDITORIAL NOTES.

In future, subscribers to the REVIEW in Nova Scotia and Newfoundland should send their subscriptions and all business communications to Editor EDUCATIONAL REVIEW, Halifax, N. S. All other subscriptions and business communications should be addressed, Editor EDUCATIONAL REVIEW, St. John, N. B.

A VALUED correspondent writes: "I also take this opportunity of saying that I find the "Book Reviews" of much interest, and that I eagerly consult the advertising columns of the REVIEW for information as to new books, etc., bearing on my every day work."

ON March 31st the School for the Blind of the Atlantic Provinces gave an exhibition of the ordinary gymnastic exercises which, for the last eight years, were conducted under the special charge of Sergeant-Major Bailey, of the Imperial forces. Both ladies and lads showed well developed physical powers, and as full an enjoyment of it as a club of cricketers. Under Principal Frazer's inspiration, eleven years ago, physical training was introduced; and after the

publication of his report this essential part of an education has been extensively introduced with the best effects into similar institutions all over the world. After the calisthenics came a short musical entertainment, the presentation of medals, with an address, and a presentation of a silver cup from the pupils to Sergeant-Major Bailey, who is about to return to England. The Atlantic Provinces have the best reasons to be proud of this school and its intelligent management. The enthusiastic principal hopes to have its accommodations doubled during the present year. Could the people of these provinces only become acquainted with the superior work done by this institution, any accommodation required would be meted out with the most ready and liberal hand. In a note of this kind we cannot even attempt to describe what an education our blind are now capable of receiving.

THE following gentlemen from the Atlantic Provinces have passed the necessary examinations and are entitled to degree M. D., C. M., of McGill University: G. A. B. Addy, St. John, N. B.; C. P. Bisset, River Bourgeois, N. S.; J. Broderick, Fredericton, N. B.; J. W. Clarke, Tatamagouche, N. S.; F. G. Corbin, Halifax, N. S.; Curtis Harland, N. B.; W. E. Jenkins, Conquerall Bank, N. S.; A. C. Lewin, St. John, N. B.; H. H. McKay, Pictou, N. S.; A. C. McLellan, Prince Edward Island; H. D. McManus, Fredericton, N. B.; James Ross, Halifax, N. S.; W. A. Wilson, N. B.; E. S. Yorston, Truro, N. S.

WE are glad to learn that the Nova Scotia parliament is likely to give us an amendment this winter which will enable school-boards to establish kindergartens under the general educational system wherever they may be likely to be required.

THE N. B. University Monthly will begin in its April issue a series of sketches on the past graduates of the university. These, when completed, will be used in compiling a memorial volume, which is intended to be a complete history of the university since its foundation. The editors of the Monthly deserve great credit in taking the initiative in such a

step as this, and it is to be hoped that the friends of the university everywhere will aid them in securing the information required to complete such an important and desirable contribution to provincial history.

THERE is every prospect that a number of teachers from New Brunswick will attend the Summer School of Science which meets at Parrsboro in July. The opportunity to study science pleasantly and at the same time enjoy a holiday in one of the most interesting portions of the Atlantic Provinces should draw together a number of enthusiastic students.

The announcement is made in another column of the Summer Schools of Harvard University. The School of Botany will be under the charge of Mr. W. F. Ganong. With the excellent facilities afforded by the Botanic Gardens at Cambridge and the enthusiasm and devotion that Mr. Ganong brings to his work, this is a good opportunity to spend a few weeks profitably and pleasantly.

In the new advertisements in this month's REVIEW, Supt. Crockett calls attention to the educational exhibit for N. B. Schools, in St. John, September, 1890, and Messrs J. & A. McMillan and Alfred Morrissey advertise requisites for schools preparing for the exhibition: Messrs Ginn & Co., and D. C. Heath of Boston have announcements of new books for school and college; Chas. K. Short, St. John, advertises Dyspepticure, and Harvard University gives notice of its Summer Schools.

#### EDUCATIONAL REFORM.

Hitherto we have directed the attention of our readers to the financial aspect of the question. In our review of the subject so far, we have shown that there can be little hope of permanent and satisfactory results so long as the occupation of the teacher is merely a temporary employment, and that the only effectual remedy is the offer on the part of the school boards of such stipends as shall induce the teacher to adopt an educational career. We are well aware of the difficulties which stand in the way of such a reform, and we are not sanguine enough to believe that the change can be effected at once, but we do trust that there is sufficient intelligence and public spirit among the people of the Atlantic provinces to apprehend the reasonableness of our plea, to realize the stupendous interests which are at stake, and to initiate

some scheme, honest, broad, and practicable, which in its operation shall ameliorate the position of the teacher and thereby greatly promote the cause of education.

It was perhaps necessarily incident to the advent of a national system of education that whilst the general control was retained by the government, the management of the schools in each school-district should be vested in a board really or virtually elected by the people. The selection of the teacher, the maintenance of the school-building, and the oversight of educational matters in the school-district, contribute to create and foster an interest in them which it would be very difficult otherwise to accomplish.

Those parents who have children to educate are anxious to maintain or increase the efficiency of the school, while those who take a pride in their settlement, village or town, in its intelligence, respectability, and enterprise, co-operate with them in electing representatives to the Board in whose judgment and zeal they can confide. The system has, upon the whole, worked well in the country districts, and that too in many places in spite of the lukewarmness and parsimony which greatly impede the activity of trustees and sometimes thwart their best directed efforts. Practical, sensible men have generally been found, willing to expend time and thought upon the business of their school, and resolute to obtain for their own children and for those of their neighbors the best education of which their circumstances will allow. And the results, when we consider locality, social condition, and financial circumstances, have been sufficiently gratifying, and encourage to further and redoubled exertion to complete what has been so auspiciously begun.

But in the towns has there been that degree of success which we might reasonably expect? The circumstances under which the work of education proceeds in the towns are more favorable than in the country. Good school accommodation, careful organization, healthful competition, bright and more stimulating surroundings than in the country, greater regularity in attendance, and more liberal support, ought assuredly to be conditions under which higher attainments can be reached than in the most highly favored of our country districts. And yet, if we are to judge from reports, and the observation of competent and independent men, there is still much to be desired in the education provided in our town elementary schools. The work is too mechanical throughout all the grades, the classes are too large, and there is such an eager and anxious anticipation of the period of grading and the public exhibition at the end of the school year, that the true aim of education is lost sight

qualities most needed by our school boards were knowledge of men and of the world, prudence, moderation, patience, resoluteness, and business talent. But now when it is generally accepted and its organization complete, other requisities are necessary. There ought to be members on the board who understand educational questions, who will be able to estimate the value of a teacher's work and to distinguish the true teacher from the quack—men of culture and intelligence who alone can comprehend that the highest results in education are unattainable except by the man of scholarship and culture. Some years ago we numbered among our acquaintances a gentleman who was chairman of the school board of an important city in our dominion. He regarded its educational facilities as perfect, and in common with others besides his fellow citizens conscientiously believed that they had achieved the greatest educational success in the land. A friend of ours, a native of that city, who, after leaving it, had studied in Europe and the United States and who was well able to judge, on returning to it after an absence of some years, wrote that its educational buildings were superb, their furniture and appliances excellent, the organization admirable, and the teachers the best that could be obtained in the province—there was only one thing wanting, and that was *education*. The school board of this city felt satisfied with their work and rightly so. They had done all that they were competent to do and they had done it splendidly. What still remained unaccomplished was the most difficult task of all.

This city is, doubtless, not singular as an illustration, many of our readers may know of parallel cases. But after all how is the remedy to be found? Why not avail ourselves to a greater extent than heretofore of the assistance of professional men? Doctors, lawyers, clergymen and others could be found who would be both able and willing to assist in this great work. By education, training and habit, they ought to be qualified, and every member of the community should be disposed to render whatever service he can to advance the welfare of the town in which he resides. Nor is it fair that professional men should adopt a critical attitude towards our schools and those who manage them, and do nothing to remove the evils of which they complain. They ought to be prepared to take their share of public duty and ought to consider it an honor and a privilege to be permitted to take part in a work of such vital importance. And such an admixture of the professional element with the mercantile world, we are confident, be productive of much good. From their position and antecedents, we would be justified in expecting their advocacy of

of. *Teaching* has in many places been supplanted by the *hearing of lessons*, and the introduction of a weekly page or two from a hand-book enables pupils to say that they study some branch of science or literature. The real has, in such cases, been displaced by pretence, and drill and organization, which are means not ends, are regarded as the staple of display on show days. This may be interesting to parents whose children acquit themselves with credit on such occasions, and it may receive the commendation of such persons as see only what is placed under their eyes but are blind to everything else and are incapable of thought, but it is not in this way that young people are prepared for the duties of life. School should be made as agreeable as possible, but, while physical exercises ought not to be neglected, means must be adopted to present lessons and regular class work in general in such a manner as to conciliate the sympathy of the pupil and promote his moral and intellectual advancement.

The remedy rests with school boards and teachers. School boards for the most part consist of men engaged in business. They are selected as representatives of the community, and are supposed to know what is best adapted, in education, to meet the wants of their fellow citizens. As practical men, experienced and successful, they are asked to undertake the direction of those instrumentalities that have for their purpose the training of the intellect, conscience, and physical powers, and we know of few public positions that involve in their duties greater responsibility or require more tact and judgment for their efficient discharge. In the early years of our public school system, when asperities had to be smoothed, bitter opposition overcome, and buildings erected, the a sound education as distinguished from what is hollow and pretentious, and in judging that they would be less likely to be caught by what is showy and sensational than those who are unaccustomed to read and think on these subjects. And may we not also trust that their influence would be exerted in opposition to the exercise of that false and fatal economy that would, in the selection of a teacher, prefer cheapness to competency?

Should men of education and culture exhibit greater willingness than heretofore to serve in the capacity of school trustees, and should the people manifest a stronger desire to select such men for that important trust, we do not doubt that their influence would soon tell upon the community by the creation of a more rational sentiment in educational affairs, and upon the schools by the communication of such an impulse as shall elevate their moral and intellectual tone.

## Astronomical Notes.

## THE PLANETS FOR APRIL AND MAY.

In the middle of April all the planets except Jupiter are above our horizon sometime between sunset and midnight, and so too are the four principal planetoids—Ceres, Pallas, Juno and Vesta.

*Mercury.* Many star-gazers have never seen Mercury. There have been astronomers who never saw him either. Tradition says that Copernicus was one of them and that he lamented the fact on his death-bed. There are books which say that Mercury can't be seen without a telescope. This were strange if true, seeing that he was known ages before there were any telescopes. Of course it is not true. Mercury is sometimes as bright as Jupiter. At such times he fairly forces himself upon your attention and draws from you a "Hello! What's that?" February, 1888, and January, 1889, were times like these. But usually that's not the way you get a sight of Mercury. It's not a case of seeing an unknown bright object and asking "What's that," but a case of first forming a wish to see the known object and then saying "Go to, let us look for him." And if we know where and when to look and have a clear sky to look into, verily we shall have our reward.

Where to look? For the present suffice it to say that when Mercury is morning star you must look for him in the east and when evening star in the west, in both cases within 20° or so of the point where the sun rises or sets.

But it is only as evening star that I am going to consider him here.

When to look? The Almanac will tell you when he is "in superior conjunction." That is when he is beginning a season of evening star performances. It will also tell you when he is "in inferior conjunction." That is the end of his evening star season. Don't look for him at either of these times. Between these dates you will find another one, that of his "greatest elongation." That is when the apparent distance in the sky between him and the sun is greatest for that season, when he is at the furthest point of his swing on the east side of the sun.

In works on Popular Astronomy the star-gazer is generally recommended to look for Mercury at the times of greatest elongation. Those are the times—or very nearly so—which Newcomb gives in his Section on Mercury. And he says that "the period of visibility extends a week or ten days on each side" of the given dates. In the "Annuaire Astronomique pour 1890," Flammarion also gives the dates of the greatest elongations, and says, "C'est à ces dates qu'il conviendra de chercher la planète, dans une période de cinq ou six jours de part et d'autre de ces grandes elongations."

Now let us consider Mercury's present season of evening appearances. It began on April 9th and will end on May 29th. That is a week less than the average, but so much the better. The brilliancy will be greatest on April 19th, the elongation on May 6th. This being the case, it will be better to modify the general rules given by Newcomb and Flammarion. Instead of beginning to look for Mercury "cinq ou six jours" or even "a week or ten days" before greatest elongation you may begin about three weeks before. If the sunset sky is clear and if you look in the right place,

you ought to see him in the middle of April or a day or two after. Use your glass of course in looking for him as early as that. Don't expect to see him three weeks or even two weeks before his greatest elongation. On April 20th he will be above our horizon for one hour after sunset and so he will be on May 20th, but on May 20th he will be only one-sixth as bright as on April 20th. At greatest elongation on May 6th he will be above our horizon for two hours after sunset. Half an hour after sunset on that evening he will be 15° above the horizon, above the W. N. W. of it nearly, a little to the south of where the sun went down. This may be of use to you if you don't happen to see him before May 6th, but you ought to see him long before that.

The latest news about Mercury is that his day and his year are of the same length. Popular Astronomies give his day as 24 hours 5 minutes long. The good ones warn you that this is very uncertain, "quite doubtful, if not entirely void of foundation," says Newcomb. And now Schiaparelli of the Milan Observatory announces that Mercury takes as long to rotate on his axis as he does to revolve in his orbit, that is, his day and his year are equal in length. We have several cases of this kind among the satellites—our own moon is the best known—but it is quite a new experience to find it in a planet. Those interested in the matter and who read German will find an article on it in the February number of *Himmel und Erde*.

*Venus.* In the middle of April last year Venus was within two weeks of the end of her career as evening star for that season. In the middle of April this year she is evening star again and has been so for two months. Then, although a moribund Hesper with only a fortnight of life left, she was bright enough to be seen at noon-day. Now, although she has been playing Hesper again for nearly two months, there are probably many who have not yet seen her. There is nothing strange in this, for she is seventy-seven millions of miles farther from us now than she was then, and not half as bright. Also, although she is now two months past conjunction and was then within only two weeks of it, she has as yet swung out to the east of the sun only two-thirds of the distance she was then from him. But there is plenty of time yet to see her; she will be evening star until December. She deserves and will perhaps get an article all to herself some time between now and then. Meantime you should be observing her increasing brilliancy, her increasing elongation from the Sun, and, later, her motion among the stars. On April 15th she is 14° east of the sun and sets an hour and a quarter after him.

*Mars.* The last time that Mars could be easily seen in our evening sky was about the middle of last April. He set then an hour and a half after sunset. In the middle of this April he rises about an hour and a half before midnight. He is now 160 millions of miles nearer us than he was then, and more than ten times as bright. Six weeks hence he will be more than twice as bright as he is now. This is one of his good years, and the owners of big telescopes are taking advantage of it to examine those curious "Canals" which Schiaparelli discovered in 1877. The trees along the banks of the Canals were "discovered" by our own Wiggins.

When you look for Mars in the south-east about an hour before midnight you will see *two* red stars. One is brighter

than the other and is growing still brighter; one twinkles less than the other; one changes its place among the stars and the other is fixed; one is the true Mars, the other is the Anti-Mars (Antares).

Next month or the month after will be a good time for a special article on Mars.

*The Asteroids.* Of these *Vesta* was at her best in January but she is still within range of a good field-glass with a patient pair of eyes behind it. She is moving east. On April 20th she will be near Psi Cancri. In June next year you will be able to see her without a glass if your eyes are fairly good.

*Ceres, Pallas and Juno* are at their best for this year in April, May and June and may be found and followed with a field glass. They are all moving west at present. On April 20th, *Ceres* will be in the north of Scorpio near Ksi, *Pallas* in the north of Serpens near Corona, *Juno* in Ophiuchus very near 23.

But this is not a good year for *Pallas*, or *Juno*, and the Asteroid-seeker had better confine his efforts to *Ceres*. Her "opposition" falls in the middle of May and she will then be about as bright as a seventh magnitude star.

Find Ksi Scorpii from its position on your map. It is the brightest star in the northern prolongation of Scorpio. South and a little east of it at a distance of  $1\frac{1}{2}$  is 11 Scorpii of the sixth magnitude. Directly east of 11 and another  $1\frac{1}{2}$  or so off is another small star of about 8 magnitude. *Ceres* will be under this one in the middle of April. At the end of the month she will be under 11. About May 20th she will be half-way between Ksi Scorpii and Gamma Librae.

This will be the best chance to see *Ceres* for several years hence.

*Jupiter.* Won't be visible before midnight until near the end of May.

*Saturn.* Saturn is now on the west side of Regulus. He was due north of the Star at the end of March, and only  $3^{\circ}$  distant. He will continue moving west until the end of April, and will be again due north of Regulus at the end of May. The ring is now at its widest for this year. This is less than half the width it showed three years ago, but it is more than double what it will show next year. The largest Satellite, Titan, may often be picked up in a small telescope if looked for at the right times. These times for the next month will be on the following dates and for a day or two on each side of them:—April 13, 21, 29, May 7, 15. On the second and fourth of these Titan will be out on the east side of Saturn, on the others he will be on the west side. Note that it is easy to cheat yourself into thinking that you have seen Titan, when you have only seen a small star that Saturn happens to be near at the time. People often make the same mistake about Jupiter's moons.

*Uranus.* Uranus is now at his best for the year. On April 14th he will be on the meridian at true midnight. If you have heard or read that he can't be seen without a telescope, don't believe it—at least not until you have given your own eyes a fair chance.

First, look at Spica, the brightest star in the south-east at 9 o'clock in the middle of April. To the left of Spica you will see (use your glass if necessary) three small stars nearly in line with each other and with Spica. That's how they will look a few days after the middle of April. The outermost of the three little fellows is—but it will be better to put it this way—two of them are stars (h and m Virginis, m may be 82 on your map), the other is Uranus. As you watch them from night to night after April 20th you will find Uranus moving slowly off the line. He will move in the same direction until the end of June and will then begin to move back, but he won't get back to that line again until it is too late in the season to see him.

*Neptune* is still up in the early evening but you had better postpone further study of him until October.

A. CAMERON.

Yarmouth, N. S.

## FERNDALE SCHOOL.

No. XXIX—BIRDS OF PREY.



BARRED OWL. *Syrnium nebulosum*. (Forst.) 368 A. O. U.  
[Shot near Bedford, Halifax, Oct. 17th, 1889. Total length from end of bill to end of tail feathers (measured before skinning) = 19 $\frac{1}{4}$  inches.]

Nightly sings the staring owl,

To-who;

Tu-whit, to-who, a merry note.

—SHAKESPEARE—*Love's Labor's Lost*. Act. V. Sc. 2.

O thou precious owl!

The wise Minerva's only fowl.

—SIR PHILIP SIDNEY—*A Remedy for Love*.

TEACHER. Here we have our Barred Owl in fine light plumage and with a very light ruff around its neck. Let me ask you some review questions on it. Does it belong to the Order *Steganopodes*?

S. No. Its toes are not full webbed.

T. Is it one of the *Tubinares*—the Order *Tubenosed* birds?

S. No. Its nostrils are not a pair of tubes.

T. First, the web; second the nostrils; now thirdly, I ask you to examine the cutting edges of its bill. Is the cutting edge fringed or toothed, or not?

S. It is not. It therefore does not belong to the Order *Anseres*—the *lamel billed* birds.

T. Fourthly. Are the legs situated in the usual position, or towards the extreme end of the body as in the *Pipipodes*?

S. Usual position. It is not one of the rump-footed birds.

T. Fifthly. Are the front toes more or less webbed?

S. No. Therefore it is not one of the *Scorcioides*—the *Longipennis*.

T. Sixthly. Is the lower part of the shank naked or feathered?

S. Feathered. Therefore it is not one of the *Wading Birds*.

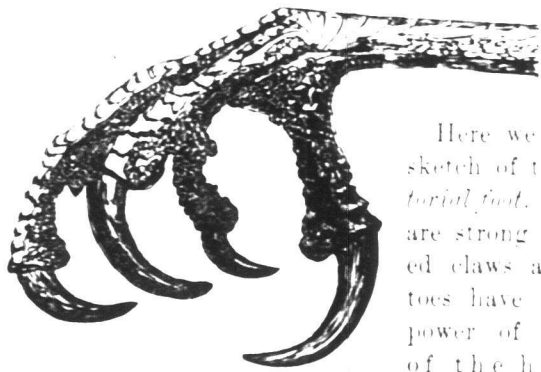
T. Seventhly. Is the bill *strongly* hooked or not?

S. Strongly. It is a bird of prey—one of the *Raptors*.

T. Or a Parrot?

S. No.

T. I might say, eighthly, that birds of prey have generally *three* toes in front and *one* behind; or *two* toes in front always, and the *third* one reversible, that is capable of grasping in front or of grasping from behind like the *fourth* toe. In parrots the toes are *two* in front and the other *two* permanently behind.



RAPTORIAL FOOT OF A HAWK

Here we have 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.

Do you remember the order of the eight points to which I called your attention.

S. Yes. 1st. Full web or not. 2nd. Tube nostrils or not. 3rd. Lamel-bills or not. 4th. Position of legs. 5th. Webbed-toes or not. 6th. Shanks naked or feathered. 7th. Bill strongly hooked or not. 8th. Their toes capable of grasping in front.

T. Very good. That will be found to be a very convenient order to proceed with the preliminary examination of a bird.

But the order *Raptors*, contains *four* families. First family the American Vultures, which have their heads generally naked.

S. It is not of the Vulture family then.

T. The second family have their eyes lateral, *i. e.*, on the sides of their head and not circled with a disk of radiating feathers—the Hawks.

S. It is not a hawk, then?

T. The third and fourth families are the Barn Owls, and the Common Owls. The Barn Owls differ from the others by having the inner toe as long as the middle; the inner edge of the middle claw pectinated; the feathers on the hinder part of the shank pointed upwards, etc.

S. Our specimen is one of the Common Owls then, as the inner toe is decidedly shorter, the inner edge of the middle claw is not comb-toothed; and all the feathers of the shank point downwards. But what are the names of the birds in each of these four families?

T. *Vulture* family. 1. Turkey Vulture. 2. Black Vulture, occasionally visiting New Brunswick from the United States.

S. *Hawk* family?

T. Common; 3. Marsh Hawk; 4. Sharp-Skinned Hawk; 5. American Goshawk; 6. Red-tailed Hawk; 7. Bald Eagle. 8. Pigeon Hawk; 9. American Sparrow Hawk; 10. American Osprey, Rare; 11. Broad-winged Hawk; 12. American Rough-legged Hawk; 13. Golden Eagle. 14. White Gyrfalcon; 15. Duck Hawk, reported as seen in New Brunswick. 16. Cooper's Hawk; 17. Red-shouldered Hawk.

S. *Barn-Owl* family?

T. None. The American Barn Owl has not been observed in these provinces. But if you should happen to take a specimen you would be able to recognize it as different from our Owls. Our Owls may be divided into *two* sub-families. The *greater*, whose wings are above *ten* inches in length; the *smaller*, whose wings are less.

S. If our Barred Owl is 19½ inches long its wings must be over 10 inches, and therefore it must be one of the greater Owls.

T. Correct. We have *six greater* Owls and *four lesser* Owls.

S. Can we have their names?

T. Certainly. The most common Greater Owls are: 18, the Barred Owl, and 19, the Great Horned Owl; not so common: 20, American Long Eared Owl; 21, American Short Eared Owl; 22, Snowy Owl, observed in New Brunswick only; 23, Great Grey Owl. The Lesser Owls are: 24, Richardson's Owl; 25 Saw-whet Owl; 26, American Hawk Owl, observed in New Brunswick only; 27, Screech Owl.

S. Why is our specimen called the Barred Owl?

T. You notice the broad lines or bars of darker and lighter browns or whites on its plumage.

S. What do they live on?

T. Any small animals, birds, chickens or insects they can capture. Their large eyes give them special advantage over many birds during the night.

S. Are they larger or smaller than our specimen, generally?

T. Larger, rather, 20 to 24 inches long; wings from 13 to 14 inches.

S. Where do they nest?

T. In trees—hollow trees often. The eggs of owls are white and oval. The eggs of the Barred Owl are two or three, nearly two inches long and over one and a half inches wide.



[For the REVIEW]

**On Collecting, Preserving and Studying Marine Invertebrate Animals.**

BY W. F. GANONG.

*Immensa et summe admirabilis Dei potentia atque solertia in rebuscalestibus, usque in aere et terra fiunt, marina vero in mari, in quo tam varia et stupenda rerum forma conspicuntur, ut querendi et ceteri plerumque nullus incipiam futurus sit finis—RONDELETIUS.*

Quoted in Forbes' History of British Starfishes.

## INTRODUCTORY.

Very few persons, aside from the professional naturalists, have any conception of the abundance of life in the sea. The average student if asked how many different kinds of flowering plants there are in a particular region, for instance New Brunswick, can give very probably an answer which is somewhere near the truth. So as to the Mammals, and the Birds, and the Reptiles, and perhaps even the Insects, he can give an intelligent answer when asked their number. But how many know that the waters that bathe the shores of Acadia, relatively barren as they may seem, contain more distinct species of animals than all of the species of Mammals, Birds, Reptiles and flowering plants of Acadia combined, and that this is still true if we exclude from our marine fauna, all the fishes, and confine ourselves to the Invertebrata alone? The sea presents a field for both professional and amateur naturalists, which is as broad as the land, and from having been worked much less, offers far more problems requiring immediate solution.

By the Invertebrates of the sea, we mean (as it is hardly necessary to mention to the readers of the REVIEW), all of those divers forms to which we are going to introduce our readers, which are not Fishes nor Mammals, or in other words, all those which have no backbone. They all fall into groups† as follows:

**PROTOZOA.** These are animals, some of which are the simplest organisms it is possible to imagine, jelly-like, very minute; only the largest of them have any definite organs for taking food or for locomotion, and even these are of a very simple sort. Many secrete

\* I ask the pardon of my readers who are not learned in Latin. So true and so appropriate to our subject are these sonorous words, and withal so beautifully fitting is their sentiment, that I am sure some at least of my readers will share the pleasure I have in them. Rondeletius, or to unlatinize it, Rondelet, was a French naturalist of the early part of the sixteenth century who wrote much on fishes and did great service to the science of Ichthyology. The book in which the sentence is quoted is a classic which is at once our admiration and our despair.

† For these brief and superficial descriptions, the writer must ask the kindly indulgence of his Zoological readers. It is not for the selearned in Anatomy they are written, but for the beginner, who should always have the most evident characters presented to him first, in order that he may follow the logical plan of proceeding from the known to the unknown. The classification is not the latest, but the most convenient.

lime or flint shells of perfect symmetry and great beauty and these are easily preserved. There must be at least some two or three hundred forms in our waters; probably there are many more.

**SPONGES.** These may be compared with great colonies of Protozoa, in which each individual is very simple and fixed in its place, but the colonial system, with its division of labor, nearly perfect. There is an elaborate system of water passages to carry food and oxygen even to the innermost parts of the colony, and another to carry off waste matters. For supporting the colony and to keep the passages open, a skeleton is built up, which is sometimes of horn-like texture, as in all the commercial sponges; sometimes of flint, as in the exquisite Venus' Flower-Basket, sometimes of chalk as in some of the forms of our own shores. We must have in all at least forty species. They live in all situations, and are always fixed to the bottom when adult.

**CŒLENERATES.** Animals that have the body hollowed out so that they resemble a thick-walled bag or sac, the whole interior cavity of which acts as a stomach. Projections called "tentacles" for taking food are usually present. In some the mouth of the sac is somewhat infolded and joined to the outer walls by vertical partitions. These are the always minute coral animals (so often wrongly called "Insects") and the "Sea-anemones," which grow to two or three inches in diameter. Of the former we have none in our waters; of the latter we have some thirty species of various sizes and colors, all of which can creep slowly about. Some of the Cœlenterates, on the other hand, have not the infolding of the mouth. These have various sorts of tentacles and various methods of locomotion, and are often collected into colonies which very closely resemble delicate plants. These are the Hydrozoa or Jelly-fishes, some of which attain a size of two feet or even more in diameter. This is one of the most interesting and, in our waters, one of the least studied groups of Invertebrates. We must have at least one hundred and fifty species, living in all sorts of situations.

**ECHINODERMS.** In this group (which to many persons is the most attractive of all), the animals have a radial arrangement, there being nearly always five equal parts arranged around a centre. The familiar Starfish is a good example. The nervous, digestive and circulatory systems all share in the radial arrangement. They are the first to have a definite digestive canal. The colors are frequently very bright and varied, and all have more or less lime in the skin. The lowest forms (Crinoids) are plant-like, stalked, and of great beauty. The Ophiurans or Snake-stars,

have five snake-like arms radiating from a disc. Starfishes with their five rays and small discs, all have seen. Sea-urchins have a shell, highly sculptured. Holothurians are soft-bodied, with the lime reduced to symmetrical plates and wheels. We have in all about forty species, living for the most part in clear water.

**WORMS.** A great group including some forms very unlike the animals we associate with this word. The animals consist of a series of rings (the common angle worm may be taken as a type), jointed together, with a nervous system along the under side, a blood system on the upper side and the digestive system between. They have definite right and left sides, and head and tail ends. Some are very soft-bodied, showing no external trace of the rings, others live in shelly tubes; some swim about freely, others are parasites and live upon industrious hosts. Some grow to be two or three or even more feet in length; others are very minute. So altogether they form a motley company, many of them appearing to be ashamed of their relationship and anxious to conceal it. They live in all sorts of situations from mud to clear water, and must number in our waters nearly two hundred species.

**CRUSTACEA.** Animals made of a series of about twenty rings or joints, hardened on the outside, some of which are usually firmly united together. These rings bear appendages which are jointed and serve as organs of locomotion, for taking and crushing food, etc. Lobsters and Crabs are examples. Nervous, blood and digestive systems are as in the Worms. They breathe usually by gills which are attached to the legs and protected under the shell of the back. They occupy all situations and the great majority can swim or walk about, though some, as the Barnacles, are fixed to rocks when adult. We have at least 250 species in Acadian waters. Some of the lower forms are very minute.

**MOLLUSCOIDEA.** A group including forms of greater variety than even the worms. Nearly all are attached to some support when adult, though the young of all can swim about, as indeed can the young of nearly all marine animals. There are three divisions of the group. The Bryozoa or Moss-animals, or Polyzoa as they are variously called, are very small, but in colonies, some of which form very prettily sculptured and colored brittle films on stones or shells, while others look like small corals, while still others bear a resemblance to plants. Each animal occupies its own little cell and has a wreath of tentacles for breathing and taking food. We must have more than sixty species. The Brachiopods are very like ordinary bivalve Molluscs in appearance, but, besides

being attached by a stalk have the shell on the front and back instead of right and left, and each has a pair of very long coiled but extensible arms for breathing and taking food. We have only two or three species. The Tunicates, or Sac-molluscs, or Ascidians, are for the most part fixed when adult, having a soft sac-like body with two small openings, one for taking in food and oxygen to the internal breathing cavity, and the other for the emission of waste matters. They grow to be two or three inches in diameter and are often brightly colored. They have great interest for the naturalist for the reason that they are believed to be more nearly related to Vertebrates than any other Invertebrates, but this is not much for us to be proud of. We have about thirty species.

**MOLLUSCA.** This is probably the group that is studied more than any other of our Invertebrates and is the best known to the readers of this paper, for is it not here that the Oyster occurs? They fall naturally into three groups. In the Bivalves (Oyster, Clam, etc.) there is a valve on the right and another on the left side. They have large flat gills, a mouth, without a head, concealed near one end, and often tubes for bringing in fresh and removing used water. In the Gasteropods (as the Whelks and Snails) the single shell is spirally coiled and the animal can withdraw into it and close the opening by a lid. They have a distinct head and a large muscular creeping disk. The Cephalopods (the Squids are examples) have a distinct head with eight or ten arms bearing suckers arranged around it, and are highly organized as to their nervous and circulatory systems. Many can swim with great rapidity. Of Mollusca we have in all over 200 species, living in all situations.

These then, are the inhabitants of the sea. How can we capture them? How can we preserve them? And how profitably can we study them? These questions we will try in a measure to answer in the three following numbers of the REVIEW.

HARVARD COLLEGE,  
CAMBRIDGE, MASS., 1881.

McGILL UNIVERSITY has lately been enriched by a donation of \$200,000 from W. C. McDonald, of Montreal, three-fourths of which goes to the Law Faculty and one-fourth to the department of Experimental Physics. With this princely gift McGill will increase its usefulness in these departments. What private benefactor is just now thinking of making a gift to any of our Atlantic Provinces Colleges? He would do himself honor, and if others would follow his example, who can estimate the benefits to future students that would follow?

FOR THE REVIEW.]

**Notes for Teaching Music by the Tonic Sol-fa Notation.**

FIFTH PAPER.

The teacher will do much to secure progress by taking five minutes forenoon and afternoon for singing, and he will also help on the other work of the school. In the short bi-weekly lesson of twenty or thirty minutes revise the former work, and try always to introduce some new point and thus keep up the interest in the lessons. In every lesson use the modulator and the manual signs.

The manual signs thus far are,—firm DOH, the hand closed, back up; rousing RAY, simply open the hand, raising the points of the fingers a little above the wrist; calm ME, raise the wrist to bring the hand to the level, palm down; SOH, turn the hand on its side little finger down; the piercing expectant TE wishing to go to DOH, the hand all closed except the index finger, pointing upwards. Remember to give a few ear exercises each lesson. After the following elementary rhythms have been mastered they can be used at the beginning of a lesson as tuning exercises. In teaching them first go over the time names, then sing each measure separately to one syllable, next take the whole exercise still using the one syllable, and after this has been done satisfactorily sing the exercise to the notes.

- No. 2. Key F. *Bugle Call "Close."*  
 : m | d : s<sub>1</sub> m d : d : s<sub>1</sub> m | d : s<sub>1</sub> m d : d : s<sub>1</sub> m | d : — | m ||
- No. 3. Key A. *Bugle Call "Fatigue."*  
 : s<sub>1</sub> | d : m : s<sub>1</sub> d : m : s<sub>1</sub> | d : s<sub>1</sub> : m : s<sub>1</sub> d : s<sub>1</sub> : m : s<sub>1</sub> | d : m : s<sub>1</sub> d : m : s<sub>1</sub> | d : s<sub>1</sub> : m : s<sub>1</sub> d ||
- No. 4. Key F. *Bugle Call "Guard."*  
 | s : m : d : s<sub>1</sub> d : m : s<sub>1</sub> | s : m : d : s<sub>1</sub> d : — | s : m : d : s<sub>1</sub> d : m : s<sub>1</sub> | s : m : d : s<sub>1</sub> | d : — ||
- No. 5. Key A. *Bugle Call "Advance."*  
 : s<sub>1</sub> | d : d : d : s<sub>1</sub> d : d : d : s<sub>1</sub> | d : s<sub>1</sub> : d : s<sub>1</sub> d : d : d : s<sub>1</sub> : — s<sub>1</sub> : — | s<sub>1</sub> : — — ||

These are in four pulse measure. If we bind two measures of two pulse measure together, and make the second strong accent, somewhat weaker,—a medium accent, we have, four pulse measure in its primary form. This measure is a little more delicate and elegant than two pulse measure. In four pulse measure, primary form, the accents are strong, weak, medium, weak, as in No. 4. We have the secondary form of four pulse measure in No. 2, No. 3, and No. 5, where the exercise begins with the third pulse, which has weak accent. The accents then are weak, strong, weak, medium. Beat four pulse measure, down, left, right, up. When any of

these exercises have been mastered in time and tune it may be used for teaching the mechanical part of expression. Thus, sing over the exercise very slowly, then quickly, then at a medium rate. Next sing over the exercise very softly, at a medium rate, then strong. Tell the pupils the signs *f* for forte, meaning strong, *p* for piano meaning soft. Again sing over the exercise beginning very softly, and gradually increase the force towards the end. Write over the beginning *p*. over the middle, *m*, for medium strong and *f*, over the end. Reverse this, beginning strong and ending very softly. In this way a great deal of teaching may be got out of one of these simple exercises. Time ear exercises may also be given. Let the teacher sing such simple exercises as the following, beating the time, and then the pupils taattai.

| d : d | d : — || : d | d : d | d || | d : — | d : d | d : — ||  
 | d : d : d | d : — || | d : — : d | d : d : — || | d : d : d : d ||

Next the teacher may introduce different tones. Give the class simple rounds and exercises, embracing the tones of the two chords taught D. and S.; but with rounds do not sing them as such until the class has reached the next step. J. A.

FOR THE REVIEW.]

**Clay Modelling.**

As the new school term is approaching and as many of our primary teachers will, no doubt, then be beginning clay modelling, a few words as to the way in which we take it up in kindergarten may not be amiss.

Some excellent suggestions and lessons appeared in the REVIEW last fall, but I think no one spoke of giving the child an idea of the *history* of the clay before beginning to work with it.

In kindergarten we endeavor to bring before the children the history of all the different materials, as they are from time to time presented to them, thus really beginning the study of *history*. We find that this has a wonderful fascination for the children, and it is, I think, one secret of the great interest they take in using the kindergarten materials. They like us to "build bridges between us and the past."

For instance, the woollen ball is traced back to the wool on the sheep's back, and is carried through all the stages of shearing, washing, picking, rolling, dyeing, etc.; the wooden blocks are traced back to long ago when a little seed fell from a tree; and a fanciful story is told of the wind covering it with the brown earth, and the refreshing showers and the beautiful sunshine all kindly aiding in its growth. The story of the branches and leaves growing year by year is told, until at last, when the tree has become large and strong, a woodman finds it,

and seeing that it is good for kindergarten blocks cuts it down. Then the history of the process it goes through at the mill is dwelt upon, and the result is that the children not only feel a deep interest in the little block, but they have a "bridge" over which they can run at will, and in so doing they become "loving and observant students of nature."

The steel rings, too, have a wonderful story to tell, but most marvellous of all is the clay. It takes us, to be sure, into the study of geology, and the "bridge" extends a long way back, but we must make it to suit the little feet that will travel over it. We tell some such story as this:

A long, long time ago, before there were any children living on the great round world, before there were any birds, or trees, or grass, or flowers, or mosses, the round world was a strange looking place. There was nothing but big oceans and rivers and great rough mountains of rock (show a piece of igneous rock—granite, for instance). Well, Jack Frost used to come around in the winter, just as he does now, and he would crack and crack the rocks making such terrible noises, and he would knock off large pieces of rock and down they would fall. Then sometimes the great round world would shake (describe simply an earthquake) and some more pieces would be thrown down, and would sometimes be "tossed in the air as if a giant were playing with them;" and there were terrible winds, and these great large pieces of rock and little pieces, too, were tossed and pushed and dashed and knocked against one another (suit the action to the word, knocking two pieces of granite together, so that they will see the result) and great pieces and small were knocked off. Then between the wind and the shaking, would these pieces of rock were pushed about and rolled down mountains and carried through swift running rivers, until they were ground to powder, finer than flour, (show some clay ground up). This powdered clay was carried along by the rivers of water (now show glass of water with clay well mixed up in it) until at last the river came to a quiet place (if you hold the glass very quietly for a few moments they will see the sediment forming in the bottom, and if their imagination has been developed you can lead them to feel that it is going to sleep and the powdered clay lay down in that quiet place and went to sleep. Oh! what a long, long quiet sleep it had! It lay there, for hundreds and thousands of years in its dark, cool beds, until one bright morning it came slowly up into the beautiful sunshine, and there it lay on top of the round world, until one day (this is the way we finish our story in Dartmouth) Mr. Condon, our Principal, went out for a walk, and seeing it, picked up some, and finding it

good for modelling got some of it for the little children to use in kindergarten.

If the story is told in some such way as this the children will not only be interested in the clay, but they will work more intelligently with it. They will readily notice the mica and compare it with that in the granite. A foundation will be laid for the study of geology and their minds will be opened up so that they can begin to read "whole chapters of the great earth's history."

MARY A. HAMILTON.

THE REVIEW

#### How to Learn a Language.\*

There is a great deal said about *how* to learn languages. There is too much said, many will add; instead of talking, go and learn the language you want; there is no royal easy road. And as Joseph de Maistre said of Latin and Greek, we have learnt these languages by a hard method, and you who are talking about simplified methods, you do not yourselves know these languages.

Still there is some use in talking about the *how*, and in trying to make the hard method easier, if not easy. Why is there? Because boys and girls, men and women, are what they are; and they may be half unknown to themselves wheedled not into a knowledge of the language, but into taking the trouble necessary for knowing it. For let us all confess that no language can be learnt with ease. It takes a life-time to learn one language, as Ruskin says. 'Picking up' a language is picking up rubbish.

It is well known, however, that many have been interested at first in a language, either by going to a country where it is spoken, or by roughly getting the sense of books necessary for a particular or technical study, or by conversation even about the most trivial matters. The people thus interested would otherwise not have learnt the language. Why not try *thus* at first to interest them?

The authors of this *Conversation Method in German* seemed to have asked themselves this question—*as* have many other teachers by the natural method. Some others, however, forgetting that a mother tongue is learnt 'naturally' by children, while the new tongue is to be learnt naturally by adults, have refused to give explanations, and refused to teach grammar. This is a new pedantry. Messrs. Bober and McKay try to teach German orally, and at the same time to explain gradually grammar and construction. With the help of a good and eager teacher their book ought to be very useful.

\*The *Conversation Method in German*. Part I. By Hans Lothar Bober and A. McKay (1890), T. C. Allen & Co., Halifax, N. S.

Names of objects are taught first, then simple questions about these, together with the forms of possessive and demonstrative pronouns or adjectives, of the comparison of adjectives, and of the most used parts of some verbs. It will be borne in mind that to teach conversation is the first object of the writers. Therefore they make things easier for pupils by not teaching more grammar than is thought necessary to understand sensibly the gradually taught conversation. They leave more with the teacher; he must indeed have energy, patience, brightness, and good temper. Certainly the teacher ought not to hurry; he ought to go over and over the first lessons, and be quite sure that all understand; it will be no use going on further in conversation if there remain some who feel confused. The class of course ought to be small.

This book comes specially recommended to many persons in several towns in the Maritime Provinces, where Herr Bober has been for some time known as a most painstaking teacher, who has, too, what are so necessary in teaching to speak a language, a clear voice and a distinct pronunciation, not to speak of the interest he gives his pupils by his enthusiasm for what is so closely connected with their study—his own great country, its position in the modern world, and its artists and thinkers belonging not to Germany alone but to us all, who by them are made to realize the common human brotherhood, and to look for our full escape from what one of them calls "that slough of national egotism."

Does not that give you a good reason for learning another language? W. F. STOCKLEY.

Fredericton, N. B.

For the REVIEW.]

#### The German School.

If the readers of the REVIEW will lay aside the study of plants, minerals, insects and stars for a short time, we will take a peep at the German school with them.

The school-houses are similar, therefore if we see one we have a good idea of all. Let us visit one. The school-building occasionally fronts on the street, but as a rule they are in the interior of a block and are connected with the street by a gateway. They are built of brick, and indicate at once that they are for use and not for ornament. The outline is regular and prosaic, and the general expression of the whole is that of solidity and massiveness rather than elegance. They are usually four storeys high and contain from twelve to twenty-four classrooms. In the upper storey is a large hall, in which sewing, music, and the festivities in connection with the school take place. In connection with each is a

play-ground, varying in size from one-quarter of an acre to two acres. The school rooms and premises are plain, clean and neat.

There is no school apparatus in the class-rooms, except one small blackboard, three by six feet, on the wall back of the teacher. One of the characteristics of the German school is thoroughness. The teacher who will politely admit us to his class-room is a servant of the State, and when he becomes unfit to teach, receives a pension from the government for life. In order to become a teacher it is necessary to take a preparatory course of study for three years, in addition to a course of three years in a normal school, after which a searching examination must be passed. A knowledge of psychology and pedagogics is considered as necessary for the teacher, as law is for the lawyer or medicine is for the physician. With this knowledge the teacher is enabled to proceed intelligently step by step in his work with a definite and clear purpose in view.

A lesson recently taught to a class in a "Seminar" will help us to an explanation. The subject was "Thinking and Memory." These activities were first discussed by the teacher and class from the standpoint of their personal consciousness. Second, Can they be strengthened? If so, when? and how? Third, Should one be exercised and then the other? or should they be developed contemporaneously? Fourth, By what means can the best results be obtained? The exercise was not bookish nor metaphysical, nor was there any attempt to cover a lack of knowledge by a definition.

Every child in Berlin six years of age must attend school according to law, and the law is implicitly obeyed. Physical education receives especial attention in the schools. Every pupil, male and female, receives two hours each week in systematic physical training, under the direction of a special teacher. Attached to each school is a "turnen halle," in which is found all the modern appliances for gymnastic exercises.

The educational report of the city for 1888 states: "that not only the bodies but also the minds, morals and manners of the children have improved under strict physical discipline." The German method of teaching language is worthy of commendation and imitation. There is comparatively little attention paid to the text-book. But from the time the child enters school there is the most careful and painstaking care paid to the proper use of language. Every mispronounced word is corrected, every sentence incorrectly formed receives immediate attention. As soon as the child is old enough, it learns selections from the best authors and recites them, as an exercise in language. In fact every school exercise is a lan-

guage lesson and no error is passed without being corrected. One of the most noted educationists of Europe, when visiting the Berlin schools, is said to have made the following statement which in the main expresses the truth: "On the whole, Berlin has a system of public schools of which she may be proud, and is proud, too. I have left every building with a quiet jealousy, not on account of the splendid rooms, but on account of the thorough and peaceful work of civilization which is accomplished in them." But I hear you call a halt and I obey. J. B. H.

Berlin, March, 1880.

#### Foreign Exchange Table.

Our teachers should take care to correct the tables of commercial values of foreign coins given in their text books. Some of these tables are from ten to twenty years old and are positively misleading at present. Many foreign coins change from year to year. During 1889 the following coins appreciably changed: Florin of Austria, silver dollar of Bolivia, Colombia, Ecuador, Peru, and the Central American States, Bolivar of Venezuela, rupee of India, silver yen (or dollar) of Japan, dollar (or peso) of Mexico, rouble of Russia, mahhub of Tripoli.

Canada and the United States having the same par of exchange with Great Britain will practically for the time being have the same par of exchange with foreign countries. For 1890, the present year, the Director of the United States Mint estimated, and the Secretary of the Treasury proclaimed, the values of the standard coins of the nations of the world, to be followed in determining the values of all foreign merchandise imported after January 1, 1890, as exhibited in the following table. By comparing this table with the tables in the "Arithmetic", we will notice: 1st, The great change in the values of foreign coins since the compilation of the "Arithmetic"; 2nd The changes of many names and even coins during the same period; Belgium, Switzerland, Spain, Italy and Greece have assimilated their monetary units in value to that of France. In South America there is a group of states which have adopted a common unit, although as in Europe, they may not have adopted a common name, namely Bolivia, Central America, Colombia, Ecuador, and Peru.

Country	Monetary Unit	Gold Value
Argentine Republic	Peso	\$0.965
Austria Hungary	Florin	.345
Belgium	Franc	.193
Bolivia	Boliviana	.698
Brazil	Milreis	.546
Canada	Dollar	1.00
Central American States	Peso	.698
Chili	Peso	.912

Country	Monetary Unit	Gold Value
China	Tael, Shanghai	1.031
	Tael, Kankwan (customs)	1.148
Colombia	Peso	.698
Cuba	Peso	.926
Denmark	Crown	.268
Ecuador	Sucre	.698
Egypt	Lb. 100 piasters	4.943
France	Franc	.193
German Empire	Mark	.238
Great Britain	Pound ster.	4.8664
Greece	Drachma	.193
Haiti	Gourde	.965
India	Rupee	.332
Italy	Lira	.193
Japan	Yen, gold	.997
	Yen, silver	.752
Liberia	Dollar	1.00
Mexico	Dollar	.758
Netherlands	Florin	.402
New Zealand	Dollar	1.014
Norway	Crown	.268
Peru	Sol	.698
Portugal	Milreis	1.08
Russia	Rouble	.558
Spain	Peseta	.193
Sweden	Crown	.268
Switzerland	Franc	.193
Tripoli	Mahhub of 20 piasters	.629
Turkey	Piastre	.044
United States of America	Dollar	1.00
Venezuela	Bolivar	.14

If this table is put on the blackboard in the school-room each pupil should be required to copy it neatly on a piece of paper of the size of a page of the "Arithmetic," and insert it following the obsolete tables.

#### Professional Training.

We visited a training school in the East recently in which a class of very bright and well-educated young women, some of whom had been teachers, and all of whom had graduated from high schools or academies, were being trained in methods of teaching. The teacher of the class was a lady of culture and of unusual teaching ability, and of unquestionable devotion. Both the teacher and the class were capable. The recitation hour was devoted to the following topic:

The class were to assume that the children they were teaching in their schools had learned all the numbers from one to ten inclusive, by the combination and separation of objects into groups. They were also to assume that the children had learned all the figures for these numbers to 6. The question was, "What would be your method of teaching these children the figure six?" The entire recitation hour was devoted to the answering of this question, the students writing their answers, which were handed to the teacher when completed. When the papers were all in the class was dismissed. Some of these

answers covered a page and a half of "letter paper." They consisted, for the most part, (1) of statements of questions they would ask the pupils about the numbers and figures below six, to be sure that they were ready for this new knowledge; (2) of an examination of their knowledge of the *number* six; (3) testing their knowledge of the written and printed word "six"; (4) asking them if they would not like to know some way of denoting *six* except by the word; (5) making the figure and having them imitate; (6) drilling them upon the use of the figure in expressing the number in several groups of different objects, each containing six.

The teacher's criticism of these papers probably occurred at the next recitation, which we could not attend. Here was the idea of definiteness and successive steps, evidently; and from the point of view of teacher and class the question was generally well answered.

But was not the point of view badly chosen? Is it not bad teaching to give these young teachers the idea that so elaborate a process as the one described is necessary to teach a child the *figure* "6," when it already knows all the numbers to *ten*, and all the figures for numbers below *six*? Is it not magnifying too much the "mint, anise and cummin" of teaching to the neglect of more important matters? Or, perhaps better, is it not giving to young teachers a false notion of thoroughness? Is the method of teaching the digit "6," under the circumstances given, or under any circumstances, of sufficient importance to consume two recitation hours in learning it and one in teaching the figure to children, *provided* the teacher has a due appreciation of the necessity of making the pupils always associate the *figure* with the *number*?

Rote teaching is abominable for the reason that the symbols used are without meaning to the learner. In fact they are not *symbols*, but are treated as if they were the things themselves.

But is there not danger that in trying to avoid this Scylla we fall into the error of forgetting that the essential thing is that the figure or word shall carry with it its meaning, by the emphasis we put upon the *method* of securing this result? Is not the study of this infinite detail of *method* a use of energy that might be used upon weightier things belonging to method; and does it not tend to narrow the range of vision of the young teachers? There is much in the details of method that may be left to the teacher, provided he sees clearly the thing to be done. The effectiveness of a method lies in its spontaneity. Is it not such normal school teaching as we have described that brings the study of methods into unmerited contempt with many plain matter-of-fact people?—*The Public-School Journal*.

#### EDUCATIONAL OPINION.

A system of daily markings at the close of each school exercise may suit teachers who hear lessons without teaching them, but if the intellectual life of the school is to be awakened and fostered, the teacher must not be hampered by the imposition of mechanical devices. Mechanical perfection in a school is intellectual torpor, and a merit book I can regard in no other light than a letter that killeth. —*Superintendent Crocket, N. B.*

One or other of two things is inevitable, and inevitable by a natural law, if our secondary education is to remain as it is. The common school must deteriorate or the university must be lowered to a secondary school. The efficiency of a common school cannot be maintained unless it is brought into sympathetic touch with something higher than itself. The grammar schools, as organized, do not meet this want. The gap between the common school and the university is too great to admit of a direct uplifting influence. It cannot stimulate the common school by drawing it up into touch with itself, but the common school, like the heavier mass, must by the sheer weight of its members, drag the university down. If the province is not prepared to sacrifice the one or the other of these interests, and I am sure it is not, I see no way of preserving them than by supplying the gap that will unify, and bring into organic relation all the parts of our educational system.—*Supt. Crocket, N. B.*

As the great value of this kind of training (science of common things) is every year more clearly manifested, it becomes necessary for teachers to qualify for science teaching, otherwise they cannot keep abreast of the times and maintain their standing. It may be objected by some that holidays are required for needful rest and recreation. Extended experience, however, proves that change of environment, the intercourse of congenial companions and the pleasing mental stimulus of new ideas, are more pleasing agencies than ignoble rest. Summer schools, originated by the grand and good Agassiz, are every year becoming more popular and useful.—*Supervisor McKay, Halifax.*

The right spirit in a class is nearly everything. The method of instruction may be poor, and there may be many things about the order and gradation that are imperfect, and yet if the teacher has the power to arouse in the pupils a spirit of inquiry, and a desire to learn what it is necessary for him to know, the pupils will make advancement and the result of the school will be good. But without the right spirit, it is impossible to make a *good* school, however well it may appear to the visitor who cannot see below the surface.

## PERSONAL.

Professor MacMechan, of the University of Dalhousie, gave an able and interesting lecture in Halifax, on the life and work of his predecessor, the late Professor James DeMill.

Miss Josie C. Upham, for several years head teacher in the Willow street schools, Truro, has been elected to a scholarship in Wellesly College, Mass. Miss Upham is to be congratulated upon this honor, as out of several hundred applicants only a limited number are annually chosen.

Smith Walker, B. A. (Acadia), and George Campbell, B. A. (Dal.), both of Truro, have recently graduated in medicine at the University of New York.

D. A. Murray, B. A. (Dal.), and former tutor of Dalhousie College has been appointed Assistant Professor of Mathematics in the University of New York.

Dr. Wesley Mills, whose book we reviewed in March, has been elected to the Royal Society of Canada, biological section.

Professor Roberts, of Windsor, has also been elected to the vacancy in the literary section of the Royal Society.

H. H. MacIntosh, Esq., Principal of the Lunenburg Academy, has been appointed to the Inspectorship of District No. 2, consisting of the counties of Lunenburg and Queens, N. S.

Hon. D. C. Fraser, B. A. (Dal.), C. H. Munro, M. D., William Cameron, B. A. (Dal.), and Jessrey McCall, representatives of Pictou County in the Provincial Assembly, entertained the students attending the University of Dalhousie from Pictou, at the Halifax Hotel last month. Over sixty guests were present. Among those present who took part in the speech making were His Lordship, Chief Justice MacDonald, Premier Fielding, Dr. MacKay, leader of the Provincial Opposition, Hector McInnes, LL.B., Stewart, of the *Herald*, Thompson, of the *Chronicle*, Howard Murray of the Halifax Academy, and many other well known provincial names.

Howard Murray, B. A. (Lond.), Classical Master in the Halifax Academy, gave an able public lecture in Halifax, March 4th, on the "Woman of Greece."

We have received the "PROGRAMA PUNTA 1890," Ann. VII of the "Instituto Internacional" of Santiago, Chile. In the "Cuerpo De Profesores," we are glad to see the name of "Sr. don Archibaldo Troop," of Nova Scotia. He is one of a faculty of the twelve professors of the institution.

## BOOK REVIEWS.

PHYSICAL DRILL FOR PUBLIC SCHOOLS, in four parts, with illustrations. Part I. Foot Drill. Part II. Arena Drill. Part III. Calisthenics. Part IV. Physical Exercises with Wands and Dumb-bells, systematized and arranged in eight grades to suit all classes, by Sergeant Major D. Bailey, Military Gymnastic Instructor. pp. 127. 16mo. (T. C. Allen & Co., 126 and 127 Granville Street, Halifax, N. S.) This is the book for which the teachers of the Atlantic provinces have been long waiting. It contains a great variety of exercises from which may be culled what can be most effectually utilized in the ungraded miscellaneous school, and in graded schools of all degrees, or in public or private gymnasia. Directions in the printed text are supplemented by a number of wood-cuts. These exercises have been arranged and selected by the most successful and popular gymnastic instructor in Canada, and were tested in the Halifax schools under the supervision of the ablest educational critics in the province, at whose suggestion this capital handbook took finally its present form.

STRUCTURE, or the Ascent of Man, by A. P. Reid, M.D., Chief Superintendent of the N. S. Hospital for Insane. Read before the N. S. Institute of Science, 13th January, 1890. 12 pages. For sale by T. C. Allen & Co., 124 and 126 Granville Street, Halifax, N. S. Dr. Reid's ideas point him out as a progressive man. We do not profess to endorse his views explicitly, but we think he is doing valuable work in calling the attention of the public to the advantage of special care in "breeding and human stock," as a stock breeder might put it. He lays down a few laws sufficient to direct the growth of the bulk of humanity towards a more perfect ideal. 1st. Hereditary Transmission. 2nd. Indissolubility of the marriage tie with its home associations. 3rd. A correct appreciation of the dignity of labor, and that all individuals be trained to make their own living by the hand as well as the head. 4th. Mental training with fixed or positive religious ideas. 5th. A general and practical education. 6th. Definite instruction in sanitary laws.

THE CONVERSATION METHOD IN GERMAN. Part I. by Hans E. Beer, Teacher of Modern Languages, and A. McKay, Supervisor of Public Schools. pp. VII. 150. 12mo. \$1.00. (T. C. Allen & Co., 124 and 126 Granville Street, Halifax, N. S.) Typographically this little book is beautifully got up, and considering the difficulty attending the setting up of German by English compositors, the text is remarkably free from errors. The volume proves one thing—that for good press work no author need go beyond the Atlantic provinces. The book has been published for the use of Professor Bober's classes. This talented teacher shows in his method the highest development of the Commenian System. Without the use of English he makes his students first think, then speak in German. The system is certainly the natural one, for in a few weeks it enables the learner to understand and use the German idiom with a naturalness which months of lumbering translation could not effect. From personal experience we have entirely lost conceit in the sole pre-eminence of the English teacher, for our German confere shows a polish—a power—and an intelligence which we have never seen excelled. German teachers will find this book a valuable aid in enabling them to teach the language in the most effectual manner known to pedagogy.



**ARITHMETIC FOR BEGINNERS**, by J. Brooksmith, M. A., LL. B., St. John's College, Cambridge, England, and E. J. Brooksmith, B. A., LL. M., Instructor of Mathematics at the Royal Military Academy, Woolwich, England; pp. 191, 12mo. (London, MacMillan & Co., and New York, 1889). This is a capital book for schools in England and is a good book here. A chapter is devoted to the "Decimal Money" and the Metric System; but there is so much of the antiquated tables of money, weights and measures, which in other generations must drift out of general use in the world, that we can commend it to the teacher as a collection of well graded exercises from which he can cull, rather than to the pupil who has to prepare himself for future work at the least possible expense of time and effort.

**AUS DEM STAAT FRIEDRICHS DES GROSSEN**, von Gustav Freytag, edited with notes by Hiram Hager, Ph. D. (Leips.) Lecturer in the German Language and Literature in the Owens College, Victoria University, Manchester. pp. 115, paper. (D. C. Heath & Co., Boston, New York and Chicago, 1889.) Heath's Modern Language Series is a most valuable acquisition to us English. The gems of foreign literature are brought before us under the most delightful circumstances possible—good print, careful editing and notes, showing the soundest judgment as to the best manner of making the difficult easy. This volume is a good example of the series.

**THE ELEMENTS OF ASTRONOMY**, a text-book for use in high schools and academies, with a Uranography by Charles A. Young, Ph. D., LL. D.; pp. VII + 470, 8vo., \$1.55. (Ginn & Co., publishers, Boston, U. S. A., and London). This is a handsome volume, with a capital analysis of matter expressed in its typography. The treatment of the subject is admirable; for without introducing higher mathematics than the algebra and geometry of our high schools, all the leading principles of the science are very clearly presented. Occasionally in the foot notes and appendix a trigonometric formula appears for the benefit of the more advanced student. A description of the constellations, with star-maps, is also included in the appendix. Its astronomical data are the newest. On the whole, we cannot say that we have seen a better presentation of the subject in any elementary form.

**LIVY, BOOK XXI**, with notes and vocabulary, by J. E. Melhuish, M. A., Assistant Master in St. Paul's School, London; MacMillan & Co., and New York. This is a neat little volume in the elementary classic series, which has proved so cheap and valuable to the student. The notes and vocabulary are so complete that the student needs no other aid to the text than a good grammar.

**FRACTIONS**. Ginn & Co., Boston, publish two very useful little pamphlets—a teacher's edition and a pupil's edition of objective and oral work in fractions. Both are illustrated with diagrams, many of which are attractively colored, and many examples are given for seat-work. In the hands of an intelligent teacher these pamphlets should lead to a clear and accurate knowledge of fractions. Price, 35 cents each.

**A SHORT HISTORY OF THE ROMAN PEOPLE**, by Wm. F. Allen, late Professor of History in the University of Wisconsin, pp. 370, mailing price, \$1.10. Boston, Ginn & Co., publishers. Students who have read the interesting volumes recently published by Ginn & Co.—Myers' General History and his History of Ancient Greece—will welcome this one, which is

in the same series, by the late Prof. Allen. This sketch of Roman history places especial emphasis upon two series of events: first, the policy and process by which the Roman Dominion was secured and organized during the Republic, its re-organization under the Empire, and final disruption at the time of the German migrations; secondly, the social and economical causes of the failure of self-government among the Romans, and the working of the same forces under the Empire; in this point of view the history of religion among the Romans is carefully traced. In maps and typographical excellence the book is all that could be desired. The "errata" slip at the end of the book, the insertion of which was, no doubt, unavoidable, should be consulted by the student before beginning his readings.

**SYNTAX OF THE MOODS AND TENSES OF THE GREEK VERB**, William Watson Goodwin, LL. D., Eliot Professor of Greek Literature in Harvard University. Ginn & Co., Boston, U. S. A. We welcome with decided satisfaction this beautiful and much enlarged edition of a work which, in its previous form and humbler dimensions, has been greatly valued by students of the Greek language. It is one of the most important contributions to Greek syntax of recent years. And although it may not attain the popularity of former editions, it will be more highly prized as a work singularly useful for private study and as a book of reference. We would say that the most distinguishing feature of the new edition is "the discussion of the origin and development of constructions." But when the work, from beginning to end, affords abundant evidence of mature study and intimate acquaintance with the Greek scholarship of Europe and America, it becomes a difficult task, particularly after a cursory examination, to single out sections as being more admirable than others. Everywhere there is indisputable evidence that the author is profoundly versed in the literature of Greek criticism, eminently discerning and sensible, and gifted with that rare attribute of scholar's lucidity in statement. This volume will prove an inestimable boon to all students and teachers of the Greek language.

**JEANNE D'ARC**, by A. DeLamartine, edited with notes and a vocabulary by Albert Barrère, Professor Royal Military Academy, Woolwich, England; Examiner to the War Office; Officier De L'Instruction Publique. pp. 188, paper. (D. C. Heath & Co., Boston, New York and Chicago, 1889). This small volume is another good example of Heath's Modern Language publications. In addition to foot-notes there is a vocabulary of words unlike the English, so that the reader has a vocabulary unburdened with any unnecessary words, and every facility to read the volume at sight. The volume is not only a leading French classic, but the subject matter is of the deepest interest were it but rudely translated into English. It is worth study alone for the intensely vivid picture of a very strange character in a very remarkable age.

**LABORATORY MANUAL OF EXPERIMENTAL PHYSICS**. A brief course of quantitative experiments intended for beginners; by Albert L. Arey, C. E., Instructor in Physics, Rochester Free Academy, with illustrations pp. 200, \$0.75. (Syracuse, N. Y., C. W. Bardeen, publisher, 1890). Progress is certainly being made in our science text-books. They are becoming guides to science instead of substitutes. Seventy leading experiments are described, with a blank ruled page opposite to record the results. It is more correct to say the seventy experiments

have particular directions given as to how they may be carried out. We would like to see our teachers test such a book with their physics classes. They will, of course, require laboratory room, and in connection with our academies and high schools, we believe the day is not far distant when physics, chemistry and physiology will be taught in the laboratory. It will require more accommodation, but the commencing laboratory work of to-day will, in a few years, develop into full class-work of a practical kind in every high school of any standing. Study nature directly from itself and not as an imitation from the shadow of another's impressions.

## RECEIVED.

MINNA VON BORNHELM, a comedy in five acts. D. C. Heath & Co., Publishers, Boston.

TWO GREAT TEACHERS: Roger Ascham and Thomas Arnold. C. W. Barden, Publisher, Syracuse, N. Y. Also by the same publisher

PEDAGOGICAL PRIMER, No. 1, on School Management.

## LITERARY NOTES.

Ginn & Co., Boston, will publish shortly "Sidney's Defence of Poesy," edited by Albert S. Cook, Professor in Yale University. This volume will furnish an admirable introduction to a general course in poetry, or to the poetry of the Elizabethan age in particular, as one of the best specimens of the earlier Elizabethan prose, it will be useful to the student of English prose in its historical development, and as the first annotated edition of the Defence of Poesy, in a critical text formed by the collation of the two earliest copies, it will be indispensable to libraries, public and private.

Ginn & Co. will publish soon Harvard Historical Monographs. No. 1, A History of the Veto Power in the United States. This will include a chapter on English and Colonial Vetoes. No. 2, An Introduction to the Study of Federal Governments. To this will be appended a parallel arrangement of the texts of the four most important federal constitutions—those of Canada, Germany, Switzerland and the United States.

A careful comparison of SECONDARY SCHOOL PROGRAMMES, FRENCH AND AMERICAN, will appear in the May *Popular Science Monthly*. The author, Mr. George W. Beaman, maintains that, if our high and preparatory schools are to compare well with those of France, the pupils must not only do more work but they must also work on more distinctly specialized lines.

## PUBLICATIONS RECEIVED.

The *Century* for April has a frontispiece illustration of a Madonna and child, the sixth article of the autobiography of Joseph Jefferson, the latest Siberian Tragedy and other interesting articles. In the Present Day Papers there is a call for improved educational facilities and compulsory attendance at schools everywhere. In the *Popular Science Monthly* for April there is a paper by Prof. David Starr Jordan, on Science in the High School, which will bear

reading twice. *W. & A. S. Co.* for April is an admirable Easter number. The *Review* for March has an excellent sketch of Dotchboy's Hall, Yorkshire, the residence of the famous Mr. Squiers. The *Scientific American* of a recent date has an illustration and sketch of the Halifax Dry Dock—the largest on the American continent. *Garden and Forest* for April has a fine illustration of the Sugar Maple, with an appropriate article on this useful tree. *St. Nicholas* for April opens with an illustrated sketch, "Six Years in the Wilds of Central Africa," by one of Stanley's pioneer others. The New York Printing and Engraving Company, 320 Pearl Street, New York, has issued one of the neatest and most original calendars of the season. It is a model of photo-engraving art.

## NOVA SCOTIA SUMMER SCHOOL OF SCIENCE.

The Fourth Annual Session of the Nova Scotia Summer School of Science will be held at Parrsboro, N. S., from July 21st to August 2nd, 1890. Opening address in the Skating Rink, July 21st, 7:30 p. m. The course of study includes:

ZOOLOGY, 8 lectures. By Principal A. H. MacKay, Halifax Academy, assisted by John Brittain, Esq., N. B. Normal School, Fredericton.

BOTANY, 8 lectures. By Inspector Lay, Amherst; assisted by Prin. Coughton, Compton Avenue School, Halifax.

MINERALOGY, 8 lectures. By A. J. Pinco, A. M., Truro; assisted by Miss Mary Dwyer, St. Mary's School, Halifax.

PHYSICS, 8 lectures. By Principal E. McKay, New Glasgow.

CHEMISTRY, 8 lectures. By Prof. A. E. Coldwell, Acadia College, Wolfville; assisted by W. E. Kennedy, Esq., Halifax Academy.

PHYSIOLOGY, 8 lectures. By Prof. Burwash, Mt. Allison College, Sackville.

GEOLOGY, 4 lectures. By Prof. Kennedy, Kings College, Windsor.

ASTRONOMY, 4 lectures. By Principal Cameron, Yarmouth Academy.

TONIC SOL-FE. Miss A. F. Ryan, St. Mary's School, Halifax.

ELOCUTION. By Miss H. E. Wallace, Acadia Seminary, Wolfville.

MODERN LANGUAGES. By Herr Lothar Bober, Halifax.

It is only in very exceptional circumstances that teachers and science students can take a holiday excursion so cheap, so profitable, and so delightful and refreshing as that here offered. Class fees from \$2.00 to \$6.00; board, \$6.00, with free or one-third return tickets. For a person living 100 miles from Parrsboro, \$15.00 will easily cover necessary expenses, including apparatus, etc.

Laboratory and Field work will be made the basis of all the science teaching.

There will be an opportunity of acquiring a theoretical and practical knowledge of Tonic Sol-fa.

The talented elocutionist of Acadia Seminary has consented to give a course of lessons on "Voice Culture and the Teaching of Reading."

Herr Lothar Bober, whose classes include the leading educationists of Halifax and Truro, and who is most favorably known in Fredericton and St. John, will illustrate the true method of acquiring a conversational mastery of modern languages.

The attention of teachers and science students in the Maritime Provinces is invited to the professional and practical advantages of this Summer School.

For a calendar giving full particulars regarding text-books, their cost, apparatus, etc., recommendations from the lecturers, etc., address

A. MCKAY,

Secretary Summer School of Science,

Halifax, 7th February, 1890.

Halifax, N. S.

**Educational Exhibit.**

This Department purposes to make an Educational Exhibit in connection with Canada's International Exhibition, to be held in the City of St. John, opening September 24th and continuing till October 4th and respectfully solicits the co-operation of Teachers and Boards of Trustees in this behalf.

The Exhibit will consist of (1) Specimens of Manual Work, (2) School furniture, apparatus, maps, text books, photographs of school-buildings, etc.

Specimens of Manual Work should embrace the requirements of the course in this respect, both in graded and ungraded schools.

**GRADED SCHOOLS.**—Specimens from the several Standards to be as follows: Standard I.—*Common print, modelling of forms in clay, paper forms.* Standard II.—*Print script, modelling in clay, paper forms, representation of school room* as embodying first ideas of a map. Standard III.—*Print scrip, modelling in clay, paper forms, drawings* from Shorter Course in Form Study and Drawing, *map of County.* Standard IV.—*Writing*—answers to questions on reading lesson and weaving them into a connected narrative, *modelling and drawings* as before, *map of the Province.* Standard V.—*Writing*—a short narrative composition, or the substance of an oral lesson on the effects of alcohol on the organs of circulation, *modelling and drawings* as before, *outline map of the Dominion.* Standard VI.—*Writing*—narrative composition, or the substance of some oral lesson in physics, *modelling and drawings* as before, *map of one of the Provinces of the Dominion* (not New Brunswick). Standard VII.—*Writing*—a short historical narrative, or description of some experiment in the chemistry of Common Things, and *one* of the first fifteen propositions of geometry, *modelling and drawings* as before, *map of South America, or Australia.* Standard VIII.—*Writing*—specimens of accounts and bills; algebra, an easy equation and a problem; expansion of a sentence into a narrative paragraph, or the substance of some oral lesson on respiration, *modelling and drawings* as before, *map of Palestine or England.*

Specimens of *sewing and knitting*, as practised in the respective standards, or specimens of work done in schools where the instruction is not graded.

**UNGRADED SCHOOLS.**—Standard I.—*Common print and print script, modelling of forms in clay* (optional). Standard II.—*Print script, modelling* as before, *map of school room.* Standard III.—*Print script, answers* to questions on Reading Lesson, *modelling* as before, *drawings* from Shorter Course in Form Study and Drawing, *map of County.* Standard IV.—*Writing*—A letter on some familiar subject, *modelling* as before, *drawings* as before, *map of the province.* Standard V.—*Writing*—A short narrative, or substance of a lesson on an agricultural topic, specimens of accounts and bills, *modelling* as before, *drawings* as before, *map of one of the Provinces of the Dominion* (not New Brunswick), or *outline map of Europe.*

In addition to the foregoing, each school will have the privilege of exhibiting any special work in harmony with the requirements of the Course of Instruction.

As the Shorter Course in Form Study and Drawing has only recently been taken up in the schools, teachers may, if they prefer, forward specimens of work done by the more advanced pupils in the previous course.

In Grammar or High Schools in which the work is in advance of Standard VIII, specimens of such manual work as is practised may be forwarded; also written translations from Latin, Greek, or French into English, or *vice versa*. Specimens of demonstrations, or solutions of mathematical problems, chemical equations, and illustrative diagrams, arising out of some experiment which the pupil has performed or seen; and illustrations of other work in Natural Science.

It is recommended that all the pupils in a Standard participate in the exercises of the Standard, and that the larger number, at least, of the specimens be forwarded, the object of the Exhibit being to show the general character of our school work, and not merely to display the performances of exceptional pupils.

The Exhibition Committee intend to award prizes in each Standard, or to recognize in some way the merits of the work.

The name of the School and the number of the Standard should be written at the top of each paper, and the name of the pupil at the bottom, near the right hand corner. Models should indicate in some way the Standard and name of the pupil.

All the papers from each school should be arranged according to their subjects, in Standards, and made up into a package addressed (prepaid) to the Education Office, Fredericton. Modellings should be neatly packed in boxes, with sliding covers, with the name and number of the school or district, inside the cover, and addressed as above.

All school work intended for the exhibit should be forwarded to the Education Office not later than the last day of the current term—June 30th.

The papers will be bound into folio volumes before being forwarded to the exhibition, as was done in the case of the London exhibit, the Boards of Trustees of cities and incorporated towns, and all other towns having a school enrolment of over 200, bearing the expense of binding their own papers, which will be but little.

Paper of the following sizes should be used: For Writing and Print Script, Orion Superfine Post, 11x8 $\frac{1}{2}$ ; Drawings, Extra Superfine Royal (44) Ledger, Cream Wove, 12x9 $\frac{1}{2}$ ; Map, Toned Double Royal (60), 13 $\frac{1}{2}$ x10 $\frac{1}{2}$ . Special work or maps may be double size.

Friday, October 3rd, will probably be allowed as a holiday to such schools as contribute to the exhibit.

After the Exhibition, the exhibit will receive a place in the Educational Museum at Fredericton.

W. M. CROCKET,  
Chief Superintendent Education.

Education Office, Fredericton, N. B.,  
April 5th, 1890.

# GEOGRAPHY

**Picturesque Geography.** 12 lithograph plates 15x20 inches, and pamphlet describing their use. Per set, \$3; mounted, \$5.

MRS. L. P. HOPKINS, *Supervisor in Boston Schools*: "Altogether the best. I have urged very strongly that a set be furnished each primary school in the city."

DR. W. M. T. HARRIS, *Concord, Mass.*: "Of real service in teaching the child the concrete meaning of the technical term used in Geography."

**Jackson's Earth in Space.** Presents simply the main features of Astronomical Geography for Grammar and Intermediate Schools. The only book on the subject. Retail price, 40 cents. Just introduced into the Boston Grammar Schools, and authorized for New York also.

**Nichol's Topics in Geography.** A Transcript of successful work in the school-room. Generally acknowledged to be the best book on this subject yet made. Retail price, 65 cents.

May be made pleasant and profitable  
by using the following new aids:

**Redway's Manual of Geography for Teachers.**

1. Hints to Teachers. 2. Modern-Facts and Ancient Fancies. Retail price, 65 cents. To illustrate its popularity, over 1000 copies have been sold to Pennsylvania teachers alone in the last few months.

**Progressive Outline Maps,** printed in dim outline, to be filled in by the pupil, with the graphic representation of all kinds of geographical facts. Thousands of cities and towns are using them. Sample Map and Circulars free. Price by mail 2 cents each; \$1.50 per hundred.

E. E. WHITE, *recently Supt. of Schools, Cincinnati*: "I hold map drawing to be a means and not an end. I therefore shall use and strongly commend your maps."

A discount of 20 per cent from retail prices to teachers.

Write for Circulars and Price Lists.

**D. C. HEATH & Co., Publishers, Boston, New York & Chicago.**

# McGILL UNIVERSITY, MONTREAL.

The Calendar for the Session of 1889-90 contains information respecting conditions of Entrance, Courses of Study, Degrees, etc., in the several Faculties and Departments of the University, as follows:

FACULTY OF ARTS—Opening Sept. 16th, 1889.  
DONALDA SPECIAL COURSE FOR WOMEN—Sept. 16th.  
FACULTY OF APPLIED SCIENCE—Civil Engineering, Mechanical Engineering, Mining Engineering, and Practical Chemistry.—Sept. 16th.

Address McGill College.

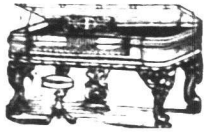
## A. T. BUSTIN,

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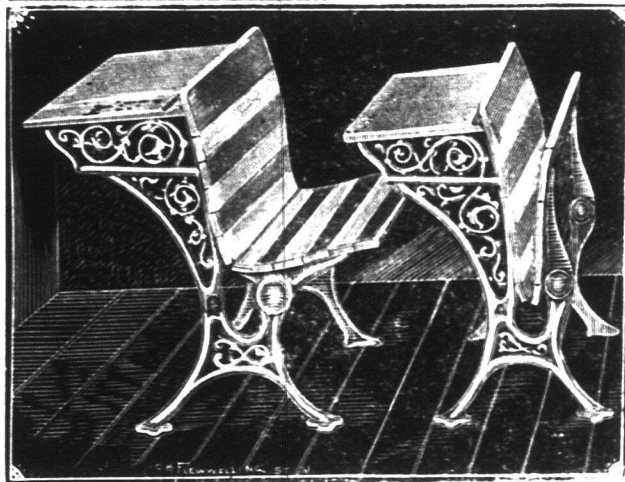
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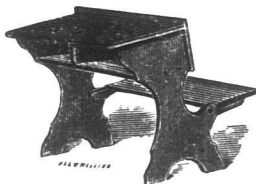
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