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MISSING

The Educational Review.

Devoted to Advanced Methods of Education and General Culture.

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EDITORIAL NOTES.

No subscriber, we are sure, would knowingly do us an injustice, yet many change their address without giving us due notice, and the paper is continued to the old address, causing loss and placing us at a disadvantage. It is the duty of honest and careful postmasters either to forward the paper to the new address or return it to the office of publication. As the paper sometimes fails to find subscribers in their new homes, or to find its way back to the office, we would thank our subscribers to attend to this matter themselves — promptly notify us on a postal card of a change of address.

WE give elsewhere a very meagre sketch of the proceedings of the educational convention at Halifax, but enough to indicate its character. In the first place it holds out Nova Scotia as an example which may well be striven after in many a proud section of the globe; for, on the same platform representatives of all religious denominations and schools of thought

of any importance worked together side by side, advancing the general good of the country by counsel or friendly criticism in educational matters. Not a word was expressed in all the discussions calculated to irritate any individual or class to the slightest extent. The general drift of the papers read was psychological. But most important of all, although there was not one-tenth a sufficiency of time for the full general discussion of it, was the proposed modified courses of study. The course for the common schools was printed; but it is too voluminous for reproduction in this issue. The report of the committee on the high school course will soon be printed, and will probably come into force before the modification of the common school course. It is in line with the resolutions passed. The committees have altogether spent a full week in hard, continuous work and discussion over these; and yet we fancy some of our readers will make "short work" of the whole on their very first reading of it.

WE cannot believe that the government of New Brunswick seriously contemplates the removal of the present Chief Superintendent of Education. While such a report has been current for some time past, there have been no reasons advanced for the change, except those of a purely political character; and these should be of little weight when it is borne in mind that the present incumbent has always had at heart the best interests of education in this Province; that his administration has been, in general, satisfactory, and that the great majority of teachers would look with disfavor on his removal.

As no meeting of either the New Brunswick or Nova Scotia Educational Association will be held this year, would it not be a good plan to hold a convention of high school teachers of the Atlantic Provinces during the next Christmas vacation? The teachers of each Province might meet separately the first day, organize, and discuss matters peculiar to advanced education in each Province; and on the second day meeting on a common platform. There are many reasons why such a meeting should be held. Now, who will set the ball rolling, and rolling to such

a purpose that before it ceases, the meeting will be an accomplished fact.

MR. ALLISON, Dalhousie, and St. Francis Xavier Colleges were the only ones represented at the Provincial Educational Association. Professor Andrews, Professors Seth and MacMechan from Dalhousie, and President McNeil from St. Francis Xavier. The Horton Academy at Wolfville was represented by Principal Oakes.

Bishop Cameron, of Antigonish, is winning unstinted praise from reformers in all religious denominations for his powerful pastoral on the temperance problem.

THE executive committee of the New Brunswick Provincial Educational Institute decided at its recent session in Fredericton to hold no meeting this year, in order to give its members the opportunity to attend the United States National and Ontario Teachers' Associations at Toronto July 13-17; or the meeting of the American Institute of Instruction at Bethlehem, N. H., one week earlier; or the Summer School of Science at Antigonish, N. S., beginning about July 20th.

WE welcome the appearance of two new periodicals since our last issue: *Canada*, edited by Rev. M. R. Knight, Benton, Carleton Co., N. B., well known for his scholarly tastes and graceful verses, and published by the N. S. Printing Co., Halifax. It is neatly printed, on good paper, and has contributions from well known literary people. In his salutatory the object is stated, "to create, where it is uncreated, and to foster and develop where it exists, a spirit of Christian patriotism in Canada." The *Methodist*, a religious weekly newspaper, edited by Rev. Dr. Wilson, and published by E. A. Powers, St. John. In its opening editorial it states its purpose, "to furnish weekly a pure, healthy paper, distinctively Methodist, but broadly Christian," * * * "not a rival to the *Wesleyan*, but a fellow worker." It has made a good start and gives promise of being an excellent family newspaper. The scholarly contributions by Mr. S. D. Scott, of the *Sun*, on "The Great Hymns of the Church," is one which no student of church history should fail to read.

THE establishing of a chair of philosophy at the University of New Brunswick has been definitely arranged, and Mr. Walter C. Murray, who has been appointed to it, will enter upon his duties in October

next, on the opening of the collegiate year. Mr. Murray is a native of Kings Co., N. B., and was graduated from the University at the head of his class in 1886. In 1887 he won the Gilchrist scholarship and went at once to Edinburgh. His course, since he first entered the university, has been one of marked success.

Such progress—the establishment of three new chairs in less than as many years—cannot fail to give an increased efficiency and a wider influence to the higher education in New Brunswick, the more especially as the establishing of these three chairs—in engineering, physics and philosophy—meets the popular demand of a broader scholarship and training of a technical character.

WE are pleased to notice the publication by A. F. Church of a new map of Nova Scotia. It is, we think, the most accurate yet, and makes a specialty of indicating where valuable minerals are located by about twenty different conspicuously colored or shaded marks. It is, therefore, well named "Church's Mineral Map of Nova Scotia." It is especially interesting in the school room.

NEWFOUNDLAND.

WE observe that the subject of public education is at present exciting more than usual attention in this island. The education committee of the House of Assembly have been offering a widely advertised prize for the best essay dealing with the problem of a better public system, the various points of which are specified in systematic detail.

In the *Telegram* of the 19th of November last, we think, there was an editorial countenancing a national system instead of a denominational one. Among all denominations there are prominent men in favor of some such solution of the problem. Whether the country is ready for such a move is, to outsiders at least, rather doubtful.

The *Twillingate Sun*, we notice, has often had articles or communications stimulating educational reform or activity. For the benefit of our Newfoundland readers, who may not otherwise see it, we quote a portion of the article. The *Sun* is certainly right in the stand which it has been taking; and in no way can a newspaper better benefit the island than by advancing and pushing a sound and active educational policy:

A TEACHERS' CONVENTION.

It may be remembered by many of our readers that some months ago reference was made in our columns to the above

subject, and the practicability of instituting a teacher's convention was then expressed and recommended. We are pleased to observe from last month's *EDUCATIONAL REVIEW*, a valuable monthly periodical for teachers, published in St. John, N. B., that the wisdom of such a convention is also mooted, and it would undoubtedly prove a stimulus to our educational institutions if such suggestions were acted upon by the teachers of all the day schools throughout the colony, and we see no reason whatever why it should not be so. Our school teachers as a rule are poorly paid, and this fact is noted by our contemporary already mentioned. In giving statistics of our schools, gleaned from the last annual reports of the respective superintendents, it says: "It can be readily seen that, so far as salary is concerned, our fellow workers in the ancient colony are not so well off as ourselves;" which point, as the writer says, is forcibly pointed out in the last reports of the superintendents. By the teachers of all persuasions meeting together once a year, at least, it would not only have the effect of creating bonds of sympathy for each other, and in each other's work, but their united action might tend to secure for them eventually a better financial standing than they at present occupy. Unless the salaries are something after the rate, it cannot be expected that a superior class of teachers will be retained in our various educational institutions; for a man who holds a first grade certificate is capable of earning a much larger salary per annum than the great majority of our teachers receive; and, therefore, it cannot be expected that our school system in the outports will ever become what it ought to while the inducements held out for first-class teachers are so discouraging.

TONIC SOL-FA IN NOVA SCOTIA.

Rev. James Anderson, M. A., the contributor of our series on the "Tonic Sol-fa" system of musical instruction, has been appointed by the government of Nova Scotia to visit the schools of the leading sections in the Province to aid the teachers in the introduction of the system. No expenditure on our educational system will return a larger percentage of benefit than the item for this purpose. Mr. Anderson has already visited the schools of Truro, Amherst, Springhill and Pictou; and has found the teachers making very creditable showings. During January and February the schools of Lunenburg, Bridgewater, Shelburne and Liverpool will probably be visited. After a few weeks of practical instruction from Mr. Anderson, nearly all teachers will be qualified to give practical instruction in their schools. Its simplicity and naturalness are the qualities which made the system so successful in Great Britain, United States and Ontario. A great many of the teachers have taken "junior" certificates from the tonic sol-fa college, of which Mr. Anderson is a duly accredited examiner. A few have taken "elementary" or second degree certificates. We shall endeavor to publish a complete list of all these, as they are reported.

FERNDALE SCHOOL.

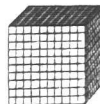
WORLD WEIGHTS AND MEASURES.

Not chaos-like together crushed and bruised,
But, as the world, harmoniously confused;
Where order in variety we see,
And where, though all things differ, we agree.

POPE.—*Windsor Forest.*

III.

T. To-day we shall have a lesson on weight. Here we have a cube centimeter, which is a very convenient part of our world measure to take for a unit of weight. A cube, you know, is the same in its three dimensions of length, breadth and thickness. Shall we take a piece of gold, or lead, or iron, or stone a centimeter in length, breadth and thickness—just about the size of the top of the little finger. Well, which is the most common substance to be found in every part of the world and can always be had pure when required?



Cubic centimeter with face divided into square millimeters.

S. Water.

T. Correct. Water can be had pure by distillation; and it is heaviest when a little above the freezing point. So, a cubic centimeter of pure cold water is taken as the unit of weight, and it is called a gram. What would the tenth of a gram be called then?

S. A decigram.

T. Correct. And the hundredth of a gram?

S. A centigram.

T. Very good. And the thousandth of a gram?

S. A milligram.

T. Suppose we cut a cubic centimeter out of a potato. Will it weigh more or less than a gram?

S. More; because the potato, is a little heavier than water.

T. Very good. Let us cut our potato centimeter into ten equal slices. How thick will each be?

S. A millimeter.

T. True. Take one of these slices and cut it into cubic millimeters. How many will there be?

S. One hundred in one slice. You can see the one hundred little squares drawn on the front big square of the cubic centimeter on the black board.

T. How many cubic millimeters in a cubic centimeter then?

S. One hundred in each slice — one thousand.

T. Right. How many cubic centimeters would there be in a cubic decimeter then?

S. Just the same — one thousand.

T. Very good. A vessel a decimeter in length, breadth, and depth would then contain how many grams of water?

S. One thousand grams of water.

T. Now, a cubic decimeter would be a convenient measure for things now measured by the pint or quart. What convenient, natural measure approximates it?

S. A decimeter is about a hand-breadth—a hand-breadth every way—why, a cubic decimeter would be a measure large enough to admit a fist which is not too big.

T. Yes; the measure is nearly equal to a quart—about $1\frac{3}{4}$ pints, and it is called a liter. How many grams of water would a liter hold?

S. 1000.

T. How many liters of water in a cubic meter of water?

S. A cubic meter is ten times longer, ten times broader and ten times deeper than a cubic decimeter—one thousand.

T. Correct. A tank is 3 meters long, 2 meters broad and 1.5 meters deep; how many cubic meters of water will it hold?

S. Nine cubic meters.

T. How many liters of water, therefore?

S. 9,000 liters.

T. What is the weight of the water in the tank?

S. A liter of water weighs 1000 grams, 9000 liters weigh 9,000,000 grams.

T. If the tank is to be filled with sand, which is twice as heavy as water; what weight of sand must be carted to the tank to fill it?

S. 18 million grams.

T. If the tank is to be filled with mortar 2.5 times heavier than water; what weight will be required?

S. $2.5 \times 9,000,000 = 22,500,000$ grams.

T. Very good. Could we find the weight of material from its dimensions so easily if we used feet and inches, and pounds? I hardly think it.

In our next lesson we shall try to make easy the remembering of how to reduce English weights and measures to their corresponding "world" or "metric" system, as it is called, and *vice versa*.

IV.—REDUCTION.

T. Now, so long as any other system of weights and measures is used we must very often have to express one in terms of the other. What do you call that?

S. Reduction, I suppose. Reducing a number from one system to the same thing in the other.

T. Correct. This laborious work must continue until the one system is universally adopted.

S. Yes, there are long lines of decimals showing how many inches in a meter, decimeter, centimeter, millimeter, and so forth—and the same for any other measure or weight.

ANOTHER S. And meters, grams, etc. are given in decimals—long decimals of inches and pounds, etc. I think it would be impossible to commit them all to memory like the other reduction tables.

T. We shall see. You will only have to remember two long decimal fractions; and I think we can make them pretty easy to remember. One for weights and one for measures.

S. That would be very nice if it could be done.

T. Well, I think we can—so well, too, that no one can forget it if he tries. You all know the smallest weight in our old kind of weights.

S. Yes. The grain, pretty nearly the weight of a grain of wheat.

T. Can you find how many grains in any of our old weights?

S. Yes; for every pound avoirdupois is 7,000 grains.

ANOTHER S. And every pound apothecary is 5,760 grains.

ANOTHER S. And every pound Troy is 5,760 grains.

T. Very good. If I can show you how to change grains into grams, you can therefore change all the old weights into the new metrical weights, or a metrical weight into the old-fashioned ones. Now I have to ask you a strange question. Is a man's body heavier or lighter than water?

S. Heavier, because he will sink.

ANOTHER S. Lighter, because he can float.

T. Well, let us compromise them. You will all agree that whether it is lighter or heavier than water, it is pretty nearly as heavy as if it were made of water. Now, what part of a man's body is about a cubic centimeter in length, breadth and thickness?

S. The top of his little finger, of course.

T. If one of the big boys, by a sad accident, had the top of his little finger cut off right at the base of the nail, what would the bulk of it be very nearly?

S. About a cubic centimeter.

T. Let me see, how many of your little fingers would come near that size. Put your little finger on our drawing of a square centimeter. The smaller boys and girls can try their biggest finger, and it will be pretty nearly a cubic centimeter. But who can tell me how much the top of that finger should weigh?

JACK. Why, a gram. Because a cubic centimeter of pure cold water weighs exactly one gram, and the human body is about the same weight as water.

T. Very good, Jack. You have caught the idea. The top of your finger is not far from the weight of a gram. How many now have the weight of the gram at the tips of their fingers?

(All hands up with more ruffling than usual).

T. If you have the gram at the tips of your fingers, you have not yet got the grains, at the same place.

JACK. No, but we are feeling for them.

T. Very good. How many large wheat, barley, or rice grains would make a bulk as big as the "gram top" of your finger, would you guess?

S. Ten, fifteen, twenty!

T. Not so bad. Your average guesses are pretty nearly correct. Now if you imagine the gram top of your finger to be broken into grains, there would be about fifteen grain fragments. I am now going to give you an imaginary ring to bind all these fragments into an exact gram weight. This imaginary ring is a magic ring, for it will bring to your mind the long decimal number exactly. How many are ready to put this ring on their fingers?

(All hands up).

T. Well, the ring is made up of numbers, a set of five numbers, all in order—just as many as the hand has fingers. Who can guess what the figures may be?

S. I suppose, 1, 2, 3, 4, 5,—that is the simplest set of five figures one can think of.

T. Very good. Imagine that row of figures to be made into a ring about your finger. Which figures would we have to solder together?

S. The 1 and the 5, thus:
$$\begin{array}{c} 3 \\ 2 \quad 4 \\ 1 \quad 5 \end{array}$$

T. Very well. The 1 and 5 soldered together will make a 15, the others may be straightened out as the decimal fraction. How many grains in one gram now?

S. 15.432.

T. Correct to three decimal places. You can easily remember it, because the numbers are 5 4 3 2 1, with the last figure brought around to touch the first, and the two touching figures make the whole number. How can you find the number of grams in our ordinary pound?

S. 1 lb. = 7,000 grains. But every 15.432 grains = 1 gram. $\therefore 7,000 \div 15.432 =$ number of grams in 1 lb. = 453.6029 grains.

T. Correct. I will lastly give you the second and last number to commit to memory—and that is all the memory work necessary. One meter is equal to 39.37 inches. For rough estimates we may count the meter as nearly equal to 40 inches; but exactly it is—

S. 39.37 inches.

T. The 39 is so nearly like the 37 that I hardly think any one can forget it. Try if you can. But you cannot. Find how many meters in a mile.

S. A mile equal to 1,760 yards, multiplied by 3, = 5,280 feet. Multiplied by 12, = 63,360 inches. But every 39.37 inches is one meter. Therefore $63,360 \div 39.37 =$ number of meters in a mile, = 1609.34 metres.

T. Correct. These two facts, then, we must always remember, if we are to be independent of tables; 15.432 grains = 1 gram, and 39.37 inches = 1 meter. We shall have some exercises in a future lesson.

Astronomical Notes.

THE MOON AND THE WEATHER.

"If Christmas comes during a waxing moon we shall have a very good year, and the nearer to the new moon the better; but if during the waning moon a hard year, and the nearer the end of the moon so much the worse."

That's one of the good old-fashioned bits of moon-weather wisdom. If it is true, this year will be a "very good" year, but yet not one of the very best; for, although Christmas came during a waxing moon the waxing was nearly all done—full moon occurring just two hours (60° time) after midnight on Christmas last.

What basis of fact this weather saw may have to rest on I don't know. If it is like a good many others of its kind, it probably owes its existence to what somebody said were the results of what somebody else thought were the observations which some other body was supposed to have made at some time or other.

Here is another, which seems to be propped by some facts. I take it, as I did the first, from a three-year old article in Longman's magazine:

"One of the most curious, and certainly one of the most widespread, of all weather beliefs is that of the Saturday moon. The notion is that when the new moon falls on a Saturday it is invariably followed by a period of wet and unsettled weather. The currency of this belief is remarkably wide. Not only is it found (more or less modified) in the folk lore of England, Scotland, and Ireland, but it is held also by seamen of all nationalities. A traveller relates that he once heard it referred to by a Chinese pilot. And more than this, in 1848, a Dr. Forster announced to the Royal Astronomical Society, as the result of an examination of weather registers kept by his grandfather, his father, and himself, extending over nearly eighty years, that nineteen times out of twenty a new moon on Saturday was followed by twenty days of rain and wind. It is not many weather sayings that enjoy the supporting testimony of a solar scientific investigation, and that circumstance, together with the general acceptance in which the saying is held, entitles it to 'special consideration.' The writer proceeds to give it 'special consideration,' and then winds up with, 'We are obliged to include this much-respected saying in the category of idle superstitions.'"

It happens that the moon of this present month of January, 1891, is a "Saturday moon." It will be a "Saturday moon" all over the earth, except just for the strip lying between 130° and 180° east longitude—there it will be a "Sunday moon." The astro-

nomical date of the new moon is Saturday, January 10th, 3 hours 24.5 minutes. If the "Saturday moon" notion is correct we ought to have a lot of wind and rain from January 10th to the end of the month, and this weather ought to prevail all over the surface of the earth, except in Japan, Papua, the eastern part of Australia, and a strip of the Pacific ocean. Let those interested in what infidels call "idle superstition" keep an eye on (and a record of) the weather from now to the end of the month. In the course of the next four years there will be nine more "Saturday moons," the dates of which are:

1891. June 6, October 17.

1892. February 27, July 23, November 19.

1893. March 18.

1894. January 6, May 5, September 29.

Sometimes a whole year passes without a "Saturday moon": 1881 was such a year. Sometimes there is only one in a year, *e. g.*, 1893; sometimes two, *e. g.*, 1887; sometimes three, *e. g.*, 1891, 1892, 1894.

The "Saturday moon" is a one-sided sort of affair. It associates itself only with foul weather. The "attitude" of the moon (especially the new moon) as seen in the sky—whether standing on end or lying on her back—is a more impartial meteorological arbiter, sending fair weather or foul, according to the form of the "attitude," and according to which of two rival interpretations you pin your credulity to—for there are sects even among the weather wise.

"The moon lies like a boat there, dost see? That's a sure sign o' fair weather—there's a many as is false, but that's sure."

So says old Martin Poyser—father-in-law to the redoubtable Mrs. Poyser—in the 18th chapter of Adam Bede.

I have consulted my weather-wise friends in regard to this matter. Some agree with old Martin and some don't. But both parties agree that when you get your first glimpse of the new moon you must observe whether she is lying on her back or standing on end. Peter Paul says: "Canoe on end, hold 'um no water." So says Paul Peter. But one of them interprets this thus: Hold no water; that is, water all run out and come down; therefore, moon-on-end betokens rainy weather, and moon-on-back fine weather. This is the Martin Poyser view; and is (I think) the orthodox faith in England. But there is another way of reading the sign. Hold no water; that is, there is no water to come down; therefore, moon-on-end betokens fine weather, and moon-on-back foul. This, according to Jamieson, is the Scottish view. Which of these views is the correct one, I don't know. According to the scientific people

they are—both of them—"lunar notions that are utterly absurd." It is to be hoped that the weather-wise will show that in this case the "absurdity" lies with the scientists, and that they will then settle among themselves which of the two contradictory interpretations is the true one. For this would be a beautifully easy way of foretelling the weather. Given the place for which the weather was wanted, and the time at which the observation of the moon should be made, it can be calculated—months or even years beforehand—just how the moon will stand or lie in the sky; and so we would be all ready for the fine or foul weather when it came. And even that is not all. By dint of some more calculation we could so judiciously fix the time of the observation as to make sure of always catching the moon when in the "attitude" that betokened whatever kind of weather we might happen to want. And that would be very nice. But if I should take my observation in the early afternoon when the moon was on end, and my neighbor should wait until evening when she was lying "sair on her back," then the poor clerk of the weather would be in a bit of a fix; wouldn't he?

In Belcher's Farmer's Almanac for the Province of Nova Scotia, at page 47, there is a "weather guide." It is in the form of a table, and professes to tell what kind of weather may be expected during the week after new moon, or first quarter, or full moon, or last quarter, according as these phases happen between midnight and 2 a. m., or between 2 and 4, or between 4 and 6; and so on to midnight again. A very useful table this, if the weather would only be good enough to regulate itself according to the rules given there. We are told that the table is "ascribed to Dr. Herschel," whoever he may have been.

A few pages further on in the almanac there are three paragraphs under the heading, "Forecasting the weather." Here is one of them:

"The earlier students based their predictions on the phases of the moon, but an examination of the Greenwich observations for more than half a century has shown that this theory is entirely unfounded. Weather prophets like Moore, Zolkiel and Vennor" [and Dr. Herschel (?)] "claim to be able to forecast the weather day by day for a whole year;" [the 'guide' claims only to do it week after week till the crack of doom] "but meteorological science in the British Isles, and the signal service of the United States, with the weather bureau of the Dominion, does (*sic*) not claim to forecast, with any certainty, the weather for more than three or four days at the most."

This seems to be rather an unkind cut at the

"weather guide," for its predictions are "based on the phases of the moon." But the cut is made as light as possible by printing it in much less prominent type than the "guide" is printed in. Such, at least, is the case in Belcher for 1889, from which I have copied the above extract. Here is the 1891 one just come in. Turning to page 47 I find the "weather guide" in its usual place; but—whew! I can't find anywhere the other paragraphs, which used to shake my faith in the "guide," and which in the 1889 almanac appeared on page 53.

What does this mean? That "the Greenwich observations for more than half a century" are untrustworthy; that "meteorological science" must take a back seat; and that the weather must be left in sole charge of the "guide?"

The writer in *Longman's*, from whom I have already quoted, pays his respects to the precious "guide" in a paragraph which is too long for this month's REVIEW.

A. CAMERON.

Yarmouth, N. S., January 2, 1891

For the REVIEW.]

The Teacher's Work.

I noticed in the October REVIEW a communication signed "Cie-Cie" which I read with interest. I have found schools just as described—where pupils were well up in reading and had not been trained in all the other branches. But in my opinion teachers are not always to blame for this. Let an individual call at a respectable farm house in the country, and in the course of his visit inquire of one of the children how far he or she is advanced at school; the answer comes at once from parents or pupil: "In the fifth book," or "fourth book," and not a word is said about other attainments. People in the country seem to regard school as a sort of lottery where their children go occasionally to *try their luck*, sometimes with books and sometimes without them. It is a great pity that parents do not take a deep interest in schools and the welfare of their children. Some parents send their children to school only when they have nothing home for them to do—and then sometimes they will hire them out to other people—as though the time at school were wasted. People who would hire help and keep children at school are those who know the value of punctual attendance at schools. Again, there are those who will not provide books. I have a school now where there are pupils who have attended school during a whole term without all of the necessary text-books. I have done the best I could orally, and repeatedly ordered the books, but the answer comes: "Father says I don't want a geography," or "they won't get me any more books,"

or "they said they would get it when they went to the store again."

When teachers see this state of lethargy—or I am half inclined to call it wilful neglect—on the part of parents they are too apt to say: "Well, if people are so mean as to refuse to take an interest in this work why should I?" The only thing we can do is persevere. Let us do what we can. Let us make an attempt to follow the course of instruction—and if we fail we will have done our duty and the fault will not be ours. I could name a number of other discrepancies with which the teacher must contend, and which need no comment to prove the vast amount of injury they do. Meanwhile let us hope that the parents who have been educated under the school system of New Brunswick will have brains to lead them to provide for the wants of their children at school.

COUNTRY TEACHER.

In ungraded schools in country districts the teacher has to grapple with the whole course. Methods have been freely discussed, pro and con, and many plans have been advanced, but these should be varied as occasion requires.

The scholars must be interested in their work. They should be encouraged to talk and ask questions about the work to be performed; but care should be taken not to provoke controversy. A pupil should not be kept at one piece of work until he comes to dislike it. This is the cause, to a great extent, of idleness and inattention to lessons, and tends to disorder which drives method to the wall.

Teachers should inspect all work done by the children, pointing out any defects which may occur and commending where work is well done. Do not adhere too strictly to time tables. Do not run a school as a through train, but switch off occasionally, especially where it is agreeable to the scholar. Change of labor brings rest, and at the same time is an inducement to perform work that is dull.

Let the work be practical. There are few lessons in the course of instruction that cannot be made, more or less, applicable to every day life. A. M.

Professor Lawson, of the University of Dalhousie, is giving a course of evening lectures on chemistry as applied to some of the arts in Halifax industries.

Professor MacGregor, with an assistant, is giving a similar course in electricity and magnetism.

The Halifax Academy is adding to its scientific apparatus. The most interesting arrival during the last month was a first class articulated human skeleton.

Practical Chemistry.

By J. BRITAIN, NORMAL SCHOOL, FREDERICTON.

LESSON III.

(1). Here is the tube in which we heated the water; what is in it now? The same water.

Yes; the water became warm and expanded; its molecules were forced farther away from each other, but they were not broken up. Hence, the water only underwent a *physical* change.

What did this tube contain before it was heated? Starch. How much starch does it contain now? None; there is nothing in it but carbon; the water has evaporated. The heat overcame the force of chemical affinity which was holding the atoms together, and the molecules were broken up. The starch underwent a *chemical* change.

You will remember, then, that any change which does not result in the breaking up of molecules is a *physical* change; while those which result in the breaking up of molecules already existing, or in the formation of new molecules, are *chemical* changes.

(2). In chemistry, an atom of carbon is represented by the capital letter C, an atom of hydrogen by H, and one of oxygen by O. The letter (or letters) by which an atom is represented is called a *symbol*. C is the symbol for carbon. The number of atoms in a molecule is expressed by placing a small figure after, and a little lower than the letter. Thus, $C_6H_{10}O_5$ denotes a molecule of starch, and is called the formula for starch. The number of molecules, or of *separate* atoms, is expressed by a larger figure placed before the formula or symbol. Thus, $6C_6H_{10}O_5$ represents six molecules of starch, and $6C$ means six atoms of carbon which have not yet united with atoms of some other element to form molecules of a compound substance.

LESSON IV.

Supply the members of the class with pieces of cork, clay, quartz, rosin, iron, copper, tin, lead, zinc. Let them scrape with a knife a small fresh surface on those specimens which do not already expose one. Direct them to place those which reflect light well—look bright or “shiny”—by themselves. The brightness, which all but the two first display, is called lustre. Ask the pupils to arrange those which possess lustre in three sets, placing together those which exhibit the same *kind* of lustre. The lustre of rosin is called *resinous*; that of quartz *vitreous* (Latin, *vitrum*, glass); that of the others, *metallic* lustre.

Let a pupil take a small glass tube in one hand and an iron wire, of about the same diameter, in the other, allowing each to project about two inches beyond the fingers. Ask him to hold them in the

hottest part of the flame of the alcohol lamp, with their ends together. Tell him to drop the one which first becomes too hot to hold. The iron will be dropped first. How do we express this difference between iron and glass? We say that iron is a good conductor of heat, while glass is a bad conductor. Try similar experiments with wires or strips of lead, zinc, copper, and tin. It will be found that they are all, but not equally, good conductors of heat. What have you known some of these substances to conduct, or allow to pass through them, besides heat? Electricity, as in telegraph and telephone wires.

What three properties, then, are common to these five substances? They possess metallic lustre, and are good conductors of heat and electricity. They are all simple substances and are called *metals* or *positive elements*. Show the class specimens of gold, silver, mercury, sodium, potassium, and, if you have them, calcium and aluminum, and lead them to see, as far as possible, that they possess the properties which the other metals were shown to have.

The three properties by which we have now learned to recognize the metals depend on their relations to the physical agents—heat, light, and electricity, and are, therefore, *physical* properties. You will learn, however, to distinguish them from other elements by their *chemical* properties, which depend upon chemical affinity.

Patriotism—How Can it be Developed in Our Common Schools?

By INSPECTOR BRIDGES, A. M.

Continued.

There is left for me to say something upon what must be considered of far greater importance to the subject under discussion than anything else—that is, an accurate knowledge in the pupil of the vast extent of our territory, and its almost illimitable resources, its healthful climate, and the beauty of its natural scenery. In reference to this last, the following words of a great American author are applicable: “On no country have the charms of nature been more prodigally lavished. Her mighty lakes, like oceans of liquid silver; her mountains with their bright aerial tints; her valleys, teeming with wild fertility; her tremendous cataracts thundering in their solitudes; her boundless plains waving with spontaneous verdure; her broad, deep rivers rolling in solemn silence to the ocean; her trackless forests, where vegetation puts forth all its magnificence; her skies kindling with the magic of summer clouds and glorious sunshine: never need a Canadian look beyond his own country for the sublime and beautiful in natural scenery.” But it is not so much the beautiful in nature to which the teacher has to direct the mind of the pupil as to the practically limitless extent of arable soil, the mineral wealth under it, the wealth of the forests above it, and the fisheries in the waters that surround it. So much of our resources has only lately been made known, and the growth of part of the

country has been so rapid that our text-book on geography *does not furnish* us, at present, with sufficient data to place in the hands of our pupils in this direction. The live teacher, therefore, must look beyond this to statistics and recent articles in magazines to be able to create in our pupils a proper appreciation of our country. The report of the committee of the Canadian Senate for 1888, Erastus Wiman's article on the greater half of the North American continent, and some recent articles by C. H. Lugin, of our Province, afford extensive information in this particular. I will now briefly review some of the more valuable of the resources of Canada, which every pupil should have some knowledge of before leaving our schools.

Let us consider for a moment the extent of her arable lands. In the Maritime Provinces, according to an official estimate, there are 18,000,000 acres, which is a little over one-half the full extent of this territory; of this amount, however, only 1,800,000 are at present under cultivation, or a little over one-tenth. In the Provinces of Ontario and Quebec there are 130,000,000 acres. In Manitoba and the various districts of the North-West there are situated 200,000,000, and in British Columbia about 50,000,000, making a total of nearly 300,000,000 acres. If we will add to this the enormous extent of country west of the McKenzie river basin, and north of the 54th parallel, which the committee of the Canadian Senate, upon careful inquiry, felt justified in reporting as adapted for the cultivation of wheat, but which, on account of its great distance from the centre of population, does not now occupy an important place among lands now offered for settlement, we would have an estimate of about 700,000,000 acres of land capable of cultivation, or just about the same amount as that of the United States. Surely there is room here for the overcrowded population of other countries. The Province of Ontario alone is almost as large as France, and exceeds, in extent of territory, the New England States, with New York, New Jersey, Pennsylvania and Maryland. While leaving out its immense forests, and minerals, and wilderness lands, it has an area which compares favorably in fertility with the most prosperous States in the Union, and its average yield of wheat in the five years ending in 1886, was greater than any of the States, with two exceptions; its total yield in 1887 being exceeded by only four States and one territory.

Speaking of the Canadian North-West, including the Province of Manitoba, a distinguished American statesman, the Hon. Horatio Seymour, is quoted as saying: "There is a country owned by England with greater grain and stock-raising capabilities than all the lands on the Baltic, the Black Sea, and the Mediterranean combined." The report of the Senate's committee in 1888 on the lands situated north of the 54th parallel in the valley of the McKenzie was as follows: That there is a possible area of 656,000 square miles fitted for the growth of potatoes, 417,000 for the growth of barley, and 316,000 for the growth of wheat. That throughout this arable area, latitude bears no direct relation to summer isotherms, the spring flowers and buds of deciduous trees appearing as early north of Great Slave Lake as in Winnipeg, St. Paul, Minneapolis, Kingston, and Ottawa, and earlier along the Peace River, where the climate resembles Western Ontario. When we consider that half the

British Isles, Denmark, Norway and Sweden, and a great part of Russia lie within the same latitude, this should not seem remarkable. The idea that the climate of our North-West was the same as that of the eastern coast exposed to the polar current, has proved erroneous. In the year 1887, the handful of people then resident in the Province of Manitoba produced a surplus of 12,000,000 bushels of wheat, 7,000,000 of barley, and 1,000,000 of potatoes. This is almost incredible. But we have to take into consideration that every day there are two hours more sunshine for wheat; underneath, by the presence of frost, there is an exudation of moisture which feeds the tender roots of the wheat plant; that the soil is so rich that for twenty years wheat crops may be grown upon the same land without rotation; and also that it is an established fact that the further north wheat can be grown it is produced in its greatest perfection. The best wheat shown at the centennial exhibition in Philadelphia was grown in the Peace river valley. So much for the extent of our territory fit for cultivation, the greatest part of which is virgin soil ready for the plough.

Next in value to farm products comes the products of the forest. It is estimated that in twenty-five years there will be hardly any timber left in the United States; and, as Mr. Butterworth has pointed out, protection with regard to their forests there means its total destruction. Not so with our country, Canada, that possesses in her forests enormous wealth. Leaving out the great triangular prairie east of the Rocky Mountains, Canada presents, up the northern limit of the growth of trees, one vast forest area, except where it has been cleared by the hand of man. Nothing accurate can be given with regard to the money value of her forest areas. Practically speaking all the uncleared land in the five eastern Provinces to the extent of 300,000,000 acres is covered with a forest growth. In the North-West Territories it was shown in evidence before the Senate committee that the forests extended from the head of Lake Manitoba to the Rocky Mountains, a distance of a thousand miles. They were not able to ascertain the width of this belt, but felt warranted in reporting the growth was far in excess of the needs of the district, and of great prospective value to the treeless regions of Canada and the United States. In British Columbia the extent of forests is very great, and the growth the largest in our country. It is, therefore, certain that Canada is richer in her extent of forest areas than any country in the world, and can probably supply any demand put upon them for many years to come.

Let me say a few words with regard to the mineral wealth of the country. Take, for instance, that of coal, which it is almost impossible for a country situated in the cold temperate zone to do without. This mineral is found throughout the different Provinces of the Dominion in inexhaustible quantities. In the North-West, enormous coal fields are found from the shores of the Arctic ocean to the international boundary. It is said that Canada has 97,000 square miles of coal lands, and she alone has coal on the Pacific slope. Iron is found in all the Provinces of the Dominion in unlimited quantities, equalling in quality the Russian and Swedish, and adapted for every purpose that iron and steel are used for. Nova Scotia is the richest in iron ores, as they lie close to her great coal areas. New Brunswick has

extensive iron deposits. In the Province of Quebec, near Ottawa, there is a hill estimated to contain 100,000,000 tons. Ontario has extensive deposits of a superior quality, and in British Columbia iron ore is found close by, and in connection with bituminous coal, of good quality, and all awaiting development. In her deposits of copper, Canada ranks, it is safe to say, above any known country in the world. It is found in many places in Nova Scotia. In the Province of Quebec, near Sherbrooke, large quantities are mined and sent to New York; and in Ontario, reaching close to the waters of the Georgian Bay, is the most wonderful copper-bearing region in the world, possessing more of the ore probably than is known to exist in the territories of the United States. In this same region is also found extensive supplies of nickel. And, besides these, already mentioned, such minerals as asbestos, antimony, graphite, gypsum, salt, gold, and silver exist in large and paying quantities.

Just a glance at the wealth of our Canadian fisheries and I am done with the resources of the country. No country in the world can compare with Canada in this particular, and there is no limit to her wealth. The Hon. Peter Mitchell once said the fisheries of Canada, as a national possession, were inestimable; and as a field of industry and enterprise were inexhaustible. She possesses a coast line greater than any country in the world, far exceeding that of the United States; and, of course, far exceeding that of any European country. Bounded by three oceans, besides numerous inland seas, our Dominion possesses over 5,500 miles of coast line, washed by waters abounding in the most valuable fishes of all kinds, and from its position in the extreme north, will continue to hold its advantage over the fishery possessions of the United States. The Arctic seas, according to Prof. Hind, swarm with minute forms of life which, in many cases, form a living mass. This all-pervading life, which exists in these northern seas, carried down by the Arctic current, affords a source of food which gives sustenance to the myriads of fish which are found in the sea in our northern latitudes. This is but a slight review of our resources. But even in this, it is found that Canada stands *pre-eminently first* in its wealth of fisheries, and the extent of its forests; and fully equal to any other in her areas of land for cultivation, and in her mineral wealth. All that is needed is additional capital and additional population. A knowledge of the resources of our country surely cannot fail to awaken in our pupils a patriotic pride in Canada, and I would emphasize this as means to the end which we are seeking more than any other.

Now, it might be asked, if it is the duty of the teachers to guard against ideas of annexation springing up among the pupils of our country. *I would say emphatically, No.* No such ideas, I believe, have gained any foothold among us. It was Martin E. Tupper who said, "That very many errors never would have thriven but for very much *learned* refutation." This error certainly has not thriven, and it is best to leave it alone. Let our newspapers, if they will, pour forth the Greek fires of their sarcasm upon the spread-eagle oratory of Yankee politicians and the buncombe talk of their newspapers in declaring that our country is ripe for annexation. But it is not *for us to notice it.* Mr. Wiman says: In no part of the British Empire is loyalty to British insti-

tutions more pronounced than in Canada, and if there is any one sentiment that universally pervades the Canadian people it is this sentiment of loyal adhesion to British connection, pride in British traditions and personal devotion to the Sovereign. Charles D. Warner, a distinguished American writer, in his comments on Canada, speaks as follows: "Annexation, put squarely to a popular vote, would make little or no show in the returns, and there are forces strong enough to keep Canada for a long time on her present line of development *on British connections.*" And what is this British connection? It is the union of Canada and other colonies, whose resources are but little less than our own, to the mother country by bonds which, though light as air, are strong as iron — the foundation of an empire, which, sixty years ago, the greatest American statesman characterized as a power to which, for purposes of foreign conquest and subjugation, Rome, in the height of her glory, is not to be compared — a power which has dotted over the whole earth with her possessions and military outposts; whose morning drum beat, following the sun, and keeping company with the hours, circles the earth with one continuous strain of the martial airs of England."

That was sixty years ago. The enormous strides made in the advancement of the British empire during these years have been so great that even the resident of the United States, with all his boundless faith in the limitless capacity of his own country, is forced to-day to admit its progress has been surpassed by no nation on the face of the earth. Is it not right, then, that the pupil should have some accurate knowledge of the British empire, the territory it includes, and a general idea of its resources. It might even be well to lead the youthful mind to speculate somewhat upon the result of a closer federation of this enormous empire. The teaching of geography in the United States is different from the subject as taught among us. There, in some of the States, at least, it is United States first, last, and all the time; and I am disposed to think that this has something to do with their great public faith in the capacity of their country. Mr. Warner, in his article, says that he once saw a map, colored according to the maker's idea of fertility, on which Canada appears little more than a green flush along the northern boundary of the United States. This probably is the ordinary idea in that country entertained concerning Canada — that it forms the northern boundary of the Union. We are more cosmopolitan in our ideas of this study. But if I were to suggest any change, it would be a little less minute teaching of the topography of our country, and decidedly more concerning the resources of Canada and the British empire.

In conclusion, I think it would be well for our teachers, in some slight way, to celebrate our public holidays; at least to teach the pupils to know why they are kept, and the history in any way connected with them; and I believe it would have an influence for good in inspiring patriotic feelings if, upon these holidays, the flag of our country might be seen floating above every school house. The exercises last 24th May at our Provincial Normal School, and the pleasure manifested by student teachers in their display of love of country and Queen form a happy incident in connection with our subject; and if the conscientious teacher would exert her or himself a little more along some of the lines here mentioned, greater results would be met with in this direction. Let us remember that we are developing the minds of those that are hereafter to become our statesmen, and direct the affairs of our country.

FOR THE REVIEW.]

"Book Knowledge Indispensable."

In the December number of the EDUCATIONAL REVIEW, under the heading, "Book Knowledge Indispensable," I notice some remarks concerning language teaching in the German schools.

Let me quote: He (the pupil) must have an elementary knowledge of grammar, in order that he may express his ideas, with some degree of accuracy. To this end he must expend, at least, *four years* in our bookish schools."

It is generally conceded that children learn to speak and write correctly, by speaking and writing, and not by studying text-book grammar. Pestalozzi, Froebel, Herbart and other educationists have striven to emphasize the importance of children being encouraged to use their senses, as in this way, they acquire the materials of knowledge.

In the German school the children are encouraged to express the ideas thus acquired in properly formed sentences and paragraphs.

Every recitation, under the direction, encouragement and criticism of the teacher, is an excellent exercise in language.

At the end of the recitation the pupils write down the ideas received from the lesson in their own words.

This written exercise is corrected by the teacher, who gives especial attention to the construction, punctuation, facility in expression, general neatness and penmanship.

The benefits which the pupils receive from the study of text-book grammar, as it is usually taught in the common school, are very limited, while too often the influence on the mind of the child is positively injurious.

For advanced students the study of text-book grammar is an excellent discipline.

"When the course is pursued which nature has indicated by the way in which she has secured correct speech; when attention is directed to thought, of which language is the expression; when sentences are analyzed with the view of gaining power to master thoughts therein; when from the offices they sustain in speech, words are inductively classified; and when from the relations which exist between words in sentences, inflections are discovered and their meaning; then grammar takes its proper place in the school."

Text-books and "bookish schools" usually exercise a cramping and narrowing influence on teachers and pupils.

The following resolution, recently passed in the Provincial Teachers' Association in Ontario, may be

quoted again: "That *technical grammar* should be removed from the public school programme, except in so far as it may be taught incidentally in a thorough course of practical language training."

In conclusion, I heartily sympathize with "Lady Teacher;" she is one of hundreds of honest, hard-working teachers who are looking for light,

This light will be found in *technical training for teachers*, fewer and improved text-books, and properly correlated courses of study. J. B. HALL.

TRURO, December, 1890.

FOR THE REVIEW.]

Kindergarten Methods in Primary Schools.

FOURTH PAPER.

Next day we talk about *square faces*. We find out by conversation with the little pupils how much they know about sharp corners, round edges, flat faces, straight lines, etc., and we call their attention to the top of the desk. (In Kindergarten the tops of the desk are marked off in one-inch squares). Perhaps they may have noticed the ruling of the desk, but their attention is now directed to it by the teacher, and she explains that some day we will have blocks to play with which will just fit into these places. Let us look at these little pieces of the desk which have straight lines all around them. Every side is the same length. All these little pieces, or spaces, are just as long as they are wide. A one-inch cube is given to each child, and each finds out that it exactly fits in one of the spaces. Several things are measured, as the teacher tells them each space is one inch long. They measure it to find out if it is as long as it is wide. The little cube's face which fits in this space so exactly must be just as long as it is wide. Some one may know the word *square*, but if none know the word is given. They now find objects in the room with square faces, and some which have not square faces. Some faces found may have to be measured before all the class is sure of them being square. The question comes up frequently, Why do you call it square? Because it is just as long as it is wide. Paper is given to the class to cut into squares, and at the close of the lesson pictures of square faces are drawn on the blackboard.

When the children are quite familiar with the cube we take up the *cylinder*. Its round face is first spoken of. We count the flat faces and compare them with the flat faces of the cube. We count all the faces and find that two flat faces and one round face make three altogether. We compare the number of the faces of the cylinder with the number the cube has. We compare what the cylinder will do with what the ball and cube will do, and each child finds

out for himself that the cylinder will roll, stand and slide. Some one may call the flat face round, because of the round edge. A ball, cylinder, cent and round paper (circle) are shown to the pupils. We find that the ball is round everywhere, the cylinder has one round face and two round edges, while the cent and circle have only round edges and a flat face.

Although the word cylinder is long, it is quickly taken up by the little folk after they once hear it. They seem to be mastering something very hard to do, and rather delight in saying it after you have told them that the name of this block is very hard to remember and a very hard word to say.

Attention is drawn to how much of the cylinder can be seen as it stands in front of you, and I have known children who had never seen a drawing of a cylinder go to the blackboard and draw the top, two sides, and a curve for the bottom. Some find it very hard to make a picture of the cylinder, and so I would talk some time about what can be seen of it before I asked them to go to the board, teach them how to look at it so they have the outline in their minds before they attempt to make a picture of it.

We might close the lessons of the second gift for the present with one more lesson. I say, for the present, because we cannot exhaust one gift before we proceed to another. We introduce each gift and then take up another afterwards, returning to find something new in the old one.

Give to each a round paper to fit the top of its cylinder, and a square paper to fit the top of its cube. Compare the objects with each other, leading the child to clothe his thoughts in good language. Try the round paper on the cube and tell why it does not fit. Try the square one on the cylinder and tell why it does not fit. Ask each pupil to arrange the ball, cube and cylinder as he likes best, and have some tell you just how they have arranged theirs, as: "My ball is on top of my cylinder, and my cylinder is standing on my cube," or "My ball, cube and cylinder are on the desk side by side," etc.

Blindfold a child and ask it to feel the different objects you hand to him and to tell you what they are. This is most interesting, and you will see the little fingers feeling earnestly. Ask some to tell you how they knew it was a cube and the answer will be, "Because they felt it." Then we know that our hands are very useful. Ask one who is blindfolded to feel a colored ball and to tell you the color of it. Several will try because they are sure they know the colors even with their eyes shut, and only find out when they have tried and make a mistake. They know now that we cannot tell the color unless we see it, that we feel shape, but can only see color.

We find the children always interested in observing the difference between the ball, cube and cylinder, at rest and in motion. The sphere is always the same, whether at rest or in motion. The cube, as it revolves, becomes a cylinder, a double cone, etc. The cylinder looks like a sphere, a double cone, etc.

The second gift comes to us provided with the necessary staples and holes for suspending in the air.

Froebel felt that this gift brought out the "law of opposites" more than any other.

The cube, sphere and cylinder taken together are the column in architecture; the cube is the base, the cylinder is the shaft, and the sphere the capital.

A monument made up of a ball resting on a cylinder, and the cylinder on a cube, stands at Froebel's grave with his name and this inscription: "Come, let us live with our children." D.

1875-1876

For the Review

Interesting to Geological Students.

In some parts of Kings County and perhaps in other parts of Nova Scotia the sub-soil is found to be full of the stones or "pits" of the wild cherry. In these districts, land covered with forest, primal in which not a cherry tree appears, will, when cleared by the woodman's axe, or by fire, produce the thickest possible growth of cherry trees. Other districts will produce trees of other previously unknown varieties, doubtless growing in the same way from long buried seeds. Is there not an interesting field here for the student? The appearance of our country hundreds, perhaps thousands of years ago,—the length of time for which seeds will retain their vitality, the nature of the preserving element and many other interesting subjects for investigation may be suggested by these facts. A pioneer settler in the "Big woods" of Minnesota informed me that in 1857, in digging a well, he struck, at the depth of twenty five feet, a red, loamy soil, very different from the soil at a lesser depth. The next spring he was surprised to find that wherever this red soil had been deposited the ground was covered with plants of the white clover, though that grass was totally unknown in the vicinity. Are similar instances known in these Provinces? W.

Corwallis, N. S., 1860-1861.

These observations are very interesting. To make valuable observations, the depth of the cherry stones, the character of the soil in which they are imbedded, etc., should be most accurately noted. If living seeds are found deep in the soil, whether in gravel, drifts, boulder clays, or in other formations, it would seem to indicate that they are survivors of a previous geological epoch. By their observation and study, a portion of the flora of a post-glacial, if not of a pre-glacial period, might be reconstructed. Extreme precautions would have to be taken to prevent errors of observation.

There is no short road to a competent knowledge of history. The study must be pursued beyond the school room and by the pupil himself.

Nova Scotia Educational Association.

The annual convention was opened on Monday evening, December 29th, in the Convocation Hall of Halifax County Academy, by the President, David Allison, LL. D., Superintendent of Education. Although the weather was not all that was desirable, the attendance was quite large. After the minutes of last meetings were read by the Secretary, A. McKay, Supervisor of the Halifax schools, a paper from Prof. F. H. Eaton, now in Berlin, on "the necessity of a Provincial manual training school for the Province," was read. This paper was printed in the Halifax newspapers, and attracted much attention. The school should be of the same grade as the high schools or academies, the academic studies being limited to English, civics, mathematics and science. The manual training should be drawing, modelling, scientific laboratory work, and a course in the workshop in wood and metal working. The course would thus fit the student for intelligent citizenship, and for the successful prosecution and development of our industrial arts.

The opinions elicited were thoroughly in favor of the principle, with a modification in detail favoring the affiliation of a manual department to each high school or academy.

The president next delighted the audience with a graphic sketch of the development and present state of education in England. His visit of a month or two this fall, following a visit a few years ago, gave him a good opportunity to note the character of late changes. The first lesson we should learn from the study of the peculiar English system is the folly of blind imitation; the second is toleration. For here, without any system of popular education in our sense of the term, the English people have shown a progress which is the admiration of the world. Then, so conservative are they of everything relating to the past, that when the spirit of the age grows with the efflux of time, the shreds of its ancient investment are retained. While the spirit changes the form still remains. He sketched rapidly the growth of popular education efforts, beginning with the Sunday-school movement of 1780, which had scarcely anything in common with Sunday-schools of to-day, except the day. Then referred to the efforts of Lord Brougham in 1816, of Lord Spencer, and Lord Althorp; and the commission of 1860 to investigate the educational systems of Germany, United States and Canada, etc., all of which led to Foster's bill of 1870. Then was laid the foundation of a state system which is fast absorbing private systems, Lancastrian and Madras, in their modern developments and denomi-

national schools. The examination and certification of teachers, prescription of courses of study, are already largely in the hands of the government. Fees are yet required to be paid in England, when pupils are able to pay. In Scotland the last step in this direction has just been taken. He eloquently illustrated the tremendously great work which the London School Board is doing in educating the entail of thirty or forty generations of illiteracy in Darkest England. He showed how the heroic educationists of the London Board throw those of other boasted cities into relief as pigmies in their efforts to elevate the masses. For, instead of following public opinion they dared to lead it. They voted a piano for every school, although nearly every paper in London condemned it as extravagant; they replied by voting a swimming tank for the children in addition. The speaker referred to the attentions received from the educational authorities, among whom was Dr. Fitch, a visitor to our interprovincial convention of 1888. R. J. Wilson, Esq., Secretary of the Halifax Board of School Commissioners, in moving a vote of thanks, referred to the historical remains of the Madras and Lancastrian schools in Halifax; the former under the title "National" system, giving its name to the "National School." Principal Oakes, of Horton Academy, and Inspector Morse, of Annapolis, seconded the motion, which was enthusiastically carried.

TUESDAY MORNING.

Professor Andrews, of Mt. Allison, read a very able paper on "The Teaching of Method" or "Mental Gymnastics." The keynote of this remarkable paper, which we hope to summarize at some future time, was Physiological Psychology.

Professor Seth, of Dalhousie, followed with another able psychological paper, entitled, the "Educational Ideal," in which he beautifully pictured the natural development of the three-fold activities of the human nature — intellectual, æsthetic and moral; and laid great stress on the necessity of psychological study on the part of the teacher, and the advantage of the study of the elements of logic in the last year of the high school.

A. McNutt Patterson, Principal of Acacia Villa Seminary, Dr. Hall, Principal MacKay and several others followed in an interesting discussion on some points mooted.

The next speaker was Mr. W. Patterson, M. A., head master of the Royal Arthur School of Montreal, and convener of the Quebec provincial committee on Canadian history. On being introduced by the president of the association he announced the object of his visit to be an endeavor to secure the co-operation

of the Nova Scotia Provincial Association in the preparation of a Dominion text on Canadian history, which would give every Province such a recognition as would unite the interests of all Canadians, irrespective of creed or nationality, and conduce towards the creation of a oneness of patriotic sentiment. A Dominion committee is already in process of formation to take the question in hand. Ontario will be represented by the Hon. G. W. Ross, M. P. P., Minister of Education; Quebec, by the Rev. Principal Virreau, of the Jacques Cartier Normal School, Montreal; and Prince Edward Island by Mr. J. O. Nicholson, B. A., Superintendent of Education.

At the conclusion of Mr. Patterson's address, a highly interesting discussion took place, in which A. H. Foster, Supt. of Education, Principal A. H. MacKay, Principal Oakes, Prof. McMechan, Revs. T. W. Smith, Robt. Murray and others took part.

The following resolution was unanimously passed:

Resolved, That the Provincial Educational Association of Nova Scotia has heard Mr. Patterson with much pleasure, and approves in general terms of his proposition regarding a Dominion text on Canadian history, and hereby recommends the appointment of a representative of this Province by the Council of Public Instruction on the Dominion committee on Canadian history.

TUESDAY AFTERNOON.

The afternoon session opened with a paper read by J. B. Hall, Ph. D., who has recently returned from Germany, where he has been for the past year engaged in a study of German methods as applied to education in that country. His paper, entitled, "Pedagogics of Herbart," was thoroughly technical and showed deep thought and ability.

The importance of psychological study was here again brought home to the teacher. We hope to present Dr. Hall's views more fully to our readers at another time. He was very enthusiastic in his praise of the German methods and of their results; and facts were quoted fully sustaining his views. J. F. L. Parsons, B. A., a former teacher and inspector, laid stress on "new teachers not turning scholars back."

PUBLIC MEETING TUESDAY EVENING.

This meeting was held in Orpheus Hall. The platform was well filled with the leading representative provincial educationists. Lieutenant-Governor Daley presided. The President of the Association, Dr. Allison, referred to the absence of Bishop Courtney on account of serious illness. The Secretary, Supervisor McKay, read a letter from Rev. Dyson Hague, regretting his absence through illness, and paying a high compliment to the Nova Scotian system, and referring to the academic system as the poor man's college, that which puts him really on a par with the

rich. Rev. Mr. Saunders was the first speaker. His leading point was the desirability and the possibility of adding manual training to our system. The possibility was illustrated by what he observed at Woodstock.

Alderman Lyons, of the Halifax Board of School Commissioners, gave a very happy address, laying chief stress on the necessity of inciting a true citizen's interest in public matters, municipal, provincial and dominion.

Rev. D. M. Gordon laid special stress on manual training as an adjunct to our present system.

Hon. Attorney-General Longley, after humorous allusions to points made by previous speakers, called special attention to the importance of training the rising generation in good manners.

His Grace, Archbishop O'Brien, said too much self-conceit was the worst feature of educationists today. He called attention to ancient systems, beginning with that of Egypt, and rapidly sketched their great results. He described the philosophers of today, Spencer, Huxley, *et al.*, as jejune in comparison with the great Thomas of Aquinas in the dark ages.

No age has a monopoly of wisdom. Our present system was a labor-saving one; but too defective to last. It was only a system of technical education after all; for the soul should be educated more fully. He would restrict free education to the primary schools. His experience seemed to indicate that free education of a higher kind was taxing the poor man for the rich man's benefit.

Rev. J. A. Rogers, on account of the lateness of the hour, being now after ten o'clock, waived his right of speech, and was followed in conclusion by

Hon. Premier Fielding, who, with a pleasing fluency and masterly ability, gathered the threads of the discussion together. He thanked those who gave their friendly criticism, and referred with pride to a system so favorable to the poor that property should supply a free education of the best kind for all, even should the property holder have no children. He thanked the association for its efforts to improve our system; and intimated that the government would attach great importance to its decisions. That not only was the government ready to follow public opinion, but to lead it, when it was sure the action was in the best interests of the country.

WEDNESDAY MORNING.

Wednesday's closing session of the Teachers' Association was fairly attended, and a mass of important business was transacted. It is safe to say that this meeting has been the most important of any held since its inauguration. The deliberations were pushed to a conclusion rapidly and with a smooth-

ness not always secured. The importance of some of the resolutions, which seem about to be carried into effect, will be far-reaching and of interest not only to the teaching profession but to the public at large. The President, in calling the meeting to order, reported that the revision committee on the course of study had not completed their work; but he submitted what had been done, with certain preliminary recommendations, which received the unanimous endorsement of the association.

(1) That provision be made in our educational system for the distinctive professional training of all teachers of public schools; (2) That the syllabus of examination for teachers' license be assimilated with the course of study for high schools, as revised; and it is suggested that third class grade D certificates be based as the subjects of the first year; second class certificates, grade C, on those of the second year, and first class, grade B, on those of the third year; (3) That in connection with examination for teachers non-professional certificates, the department of education be requested to provide for the issue of diplomas to graduates of county academies and high schools; (4) That as soon and as far as circumstances will permit, the various non-professional certificates should be taken seriatim; (5) That the professional training of teachers should be held to include fuller instruction in music, drawing, natural science, elementary logic and manual training than contemplated by the ordinary high school course.

A general discussion ensued, in which the following gentlemen took part: Principals Campbell, MacKay, Smith, Calkin, Congdon, Oakes; Professors Hall, D. K. Grant, Magee, MacMeehan; Inspectors Lay, Roscoe, MacLellan and MacDonald, and the President, Dr. Allison. The fuller consideration of the course of study for the common schools was referred to a committee consisting of the Rev. Dr. McNeil, Supervisor McKay, Professor Oakes, Principals Calkin and MacKay. A short discussion, opened by Inspector E. W. MacLellan, LL. B., on the course of study, in which a number took part, emphasized the desirability of minimizing the study of geography, and not devoting too much attention to the detailed study of the United States.

MANUAL TRAINING.

On motion of Principals Calkin and Campbell the following resolutions were unanimously adopted:

This Association records its high appreciation of Professor Eaton's paper on Manual Training, and endorses the general principles therein set forth. We believe that a well devised system of manual training is of great value, both as a general educational factor and as a means of preparation for the various industrial pursuits; and we desire to see it form a part of our educational machinery. It is our opinion, however, that such a measure can be most economically carried out, not by the organization of separate and distinct institutions, but by incorporating certain lines of manual training in the high school curriculum. As the measure may be considered as to some extent tentative in character, prudence selects the

suggestion of some one of these high schools as a field for experiment; and in our opinion the Halifax Academy presents the most favorable conditions for its introduction.

Further, As the scheme may well be considered as a matter of general interest to the whole province, and as its organization and its working involves considerable expense, it is the opinion of this Association that the local authorities should receive substantial aid from the provincial treasury.

The association viewed the idea of introducing manual training with favor, a strong expression of assent to its principles and a cordial recognition of the services of Professor Eaton, who has done so much for its cause, was given, as well as by Rev. D. M. Gordon and other speakers at last night's meeting. The reverend gentleman referred to the great pleasure he had felt in reading Professor Eaton's letter, and expressed the hope that the government would see its way clear to establish such an institution.

THE NATIONAL EDUCATIONAL ASSOCIATION

On motion of Principals MacKay and Congdon, it was decided to ask the council of public instruction to make such arrangements respecting next summer's holidays as would enable educationists to attend the approaching meeting of the United States National Education Association, which meets in Toronto in July next. The President expressed the hope that a number of the teachers would be able to attend, as he felt it would exert a splendid influence on all to meet such a vast assemblage of teachers from all parts of the great country to the south of us as would be in Toronto at that time. He also stated that he hoped to be able to work a plan by which a very low rate could be obtained from the railway authorities.

CLOSING NOTES.

The executive committee of the association appointed for next year stands as follows: Principals MacKay and Freeman; Inspectors Lay, Condon, MacLellan; Miss Burgoyne and Professor (Inspector) MacDonald.

Mr. Patterson, Principal of Royal Arthur School, Montreal, who has been in attendance for the purpose of getting all the provinces to unite in introducing a Dominion History, instead of those now in use which are only sectional, requested the association to appoint a committee to act with other provincial committees in arranging for the preparation of such a book. The committee is as follows: Principals MacKay, Campbell and Oakes.

The usual votes of thanks were passed, when the President, in a few well chosen words, closed the association.

The time and place of next meeting were not settled. Possibly no association will be convened next year, as a number of the teachers wish to attend the "national" in Toronto.

N. B. Teachers' Institutes.

York and Westmorland County Institutes met just before the holidays—the former at Fredericton, the latter at Moncton, on Thursday and Friday, December 18th and 19th.

At the York Institute, President Rogers in the chair, an excellent paper on Reading and Composition was read by Principal Inch, of the York street school. From the *Gleaner* we take the following synopsis:

Composition is interpreting thought into written language; reading is interpreting written language into thought. One should assist the other. The idea controlling the teacher should be, "Get the thought by the reading so that you can write in it your own language." Reading is not merely the fluent expression of certain sounds, though this seems to be the common method of teaching reading. Reading is getting at the writer's thought, as in silent reading. But there is another idea in reading, as it should be taught in the schools. It is the proper conveyance of the thought in language. The pupil then must be taught to get and to give the thought. But the getting of the thought is the first and most important step. Read ideas, not words. Expressive reading is, of course, important, but get the child interested in what it is reading and what interests it is usually expressive and beautiful. The child's talking tone ought to be its reading tone. Its reading ought to be the book talking. Development of the reading of ideas, not of words, in the young will lead them when older to enjoy reading, and to enjoy good reading, because they will be able to read easily. Composition should be considered an adjunct of reading. The young pupil should be taught to write as he would talk. Composition has been considered in the schools too technical, too literary, whereas it should merely be written talk. Many suggestions were given for subjects for writing, subjects taken from other studies, history, arithmetic, etc. But they should be all on something that the children know, and not on such time-honored themes as Faith, Hope and Charity, and such abstract ideas. In conclusion, he said, "In reading, aim to develop power to get the thought; in composition, use continuously the school subjects."

Over fifty teachers were enrolled. The officers elected for the ensuing year were: J. M. Palmer, A. M., President; W. T. Day, Vice-President; Miss Frances Ross, Secretary-Treasurer; Messrs. E. Everett, H. McKeen, F. Good, and Miss Clayton, additional members Committee of Management.

About seventy teachers were enrolled at the Westmorland Institute. President J. G. A. Belyea occupied the chair, and delivered a very interesting opening address on the "Necessity for Self-improvement." Papers were read as follows: "Arithmetic in Ungraded Schools," by Amos O'Brien; on "Useful Knowledge," by Geo. J. Oulton; "Moral Teaching," by Miss O. Fairweather; the "Use and Abuse of History," by Miss Harper; on "History," by M. Butler. In the course of his remarks, Mr. Butler made reference to the ability shown by the nine-year

old son of T. T. Landry, who was in attendance at his school in Memramcook. Although young in years, he possessed a knowledge that is remarkable. He is able to speak English and French fluently, can translate Latin, and has also translated many chapters of Caesar, and is possessed of a knowledge of shorthand. A paper read by Mr. McDonald, on "Natural Science," concluded the topics for discussion. In speaking of science, Mr. Oulton referred to his course at the school of science last summer, and paid a tribute to the staff and the mode of teaching pursued. He recommended strongly that teachers take advantage of the opportunity offered by these schools. No money he had ever spent had brought him such returns as that expended in the study of natural science. The election of officers resulted as follows: Geo. J. Oulton, Dorchester, President; Miss Mary Fawcett, Westmorland, Vice-President; Chas. Avar, Lakeville, Secretary; Miss Lea Dumas and S. W. Irons were added members of the executive.

QUESTION DEPARTMENT.

E. D. Please give solution (1) of question 7, page 272, Sangster's; also (2) explain, "The inhabitants of the tropics keeps himself cool on rice."

1. In our edition of Sangster (Lovell, Montreal, 1877), page 272, No. 7, reads: "In the foregoing question, A's gain was \$240 during 6 months, B's, \$800 during 12 months, and C's, \$400 during 15 months; and the sum of the products of their stocks and times is 34560.

Solution: A's gain in one month, \$40; B's, $66\frac{2}{3}$; and C's, 26. The stocks of each must be proportional to the gains for equal times. Therefore, A's stock : B's : C's :: 40 : $66\frac{2}{3}$: 26 (clearing off fractions) = 120 : 200 : 80 (reducing to lower terms) = 12 : 20 : 8 = 3 : 5 : 2

\$3 stock	×	6 months	=	18
\$5 "	×	12 "	=	60
\$2 "	×	15 "	=	30

Total products of stock and time—108

∴ 108 : 34560 :: \$3 : A's stock, \$ 960
and 108 : 34560 :: \$5 : B's stock, \$1600
and 108 : 34560 :: \$2 : C's stock, \$ 640

2. The context, if we knew it, might aid in arriving at the author's meaning. Without it we can only say, we do not understand the way,

A man burned up with tropic heat
The scorching demon thus can cheat
By digging in a plate of rice
To reach its termination—ice.

W. T.—Can skeletons and anatomical models for teaching physiology be procured in Canada?

They can, we suppose. J. H. Chapman, corner McGill College Avenue and St. Catherine street, Montreal, have such supplies.

PERSONAL.

The delegation from the English farmers to Canada, headed by Colonel Stevenson, and accompanied by Hon. Mr. Longley, Attorney-General, David Allison, Superintendent of Education, and Professor Smith, of the School of Agriculture at Truro, visited the Halifax Academy and Dalhousie College when passing through the Province.

BOOK REVIEWS.

ANNOTATED ENGLISH CLASSICS: The Ancient Mariner and Macaulay's second essay on the Earl of Chatham. Ginn & Co., Boston, publishers. Cheap and excellent reprints, in neat pamphlet form, with notes and explanations on the margin.

OLD SOUTH LEAFLETS: The Bill of Rights, Federal Constitution of the Swiss Confederation, and other cheap reprints of historical and political subjects. Schools and the trade supplied by D. C. Heath & Co., Boston.

SHAKESPEARE'S KING JOHN, by Deighton. London, MacMillan & Co. and New York. This is another volume in the Shakespearian series that is being published by the MacMillans. The print is excellent, and the notes and introduction helpful to the student.

ENGLISH PROSE FROM ELIZABETH TO VICTORIA, chosen and arranged by Prof. Jas. M. Garnett, LL. D., of the University of Virginia; pp. 701. Price \$1.65. Publishers, Ginn & Co., Boston. This contains some thirty-three extracts from the chief prose works of as many different authors, beginning with John Lyly's "Euphuus and His England" and ending with Thomas Carlyle's "Hero Worship." The selections are excellent and will be well received by those who would make a brief study of the chief authors of the above named period. The true way to study a literature is by reading more or less of the works of authors, instead of critical notes upon them; and these selections, to which brief notes are appended, will enable the students to become well acquainted with some of the master-pieces of English prose.

RAISE THE FLAG, AND OTHER PATRIOTIC CANADIAN SONGS AND POEMS. Rose Publishing Company, Toronto. This is an excellent collection for schools. Mr. E. G. Nelson, of St. John, contributes the poem mentioned in the title, and also that popular patriotic song, "My Own Canadian Home." A spirited poem, entitled, "Brothers, Awake," by Miss Aimee Huntington, formerly of Yarmouth, appears in the collection. Patriotic poems by Prof. Roberts and others are included.

OLD MORTALITY, by Sir Walter Scott, in the "Classics for Children" series. Publishers, Ginn & Co., Boston. This is printed on good type, has explanatory notes for the young reader, and is attractive looking.

CATALOGUE OF THE PICTOU ACADEMY, 1890. Here we find not only the number of students but their names and

addresses given. The proof of the value of the institution is not given in the great number and variety of university titles it offers to the faithful, but in the honors won by competition from other institutions, and the number of students it draws for a sound education—which number, during the past full year, reached near three hundred.

POST-TERTIARY DEPOSITS OF MANITOBA AND THE ADJOINING TERRITORIES OF NORTH-WESTERN CANADA, by J. B. Tyrrel, of the Geological Survey of Canada; Bulletin of the Geological Society of America, Vol. I., pp. 395-410.

THE STRATIGRAPHY OF THE "QUEBEC GROUP," by R. W. Ells, LL. D., Bull. Geol. Soc. Am. Vol. I., pp. 453-468. Pl. 10.

NOTES ON NOVA SCOTIAN ZOOLOGY, by Harry Piers. Trans. N. S. Institute of Science, Vol. VII., Part 4 (1889-90).

The above three contain each valuable additions to scientific knowledge.

INTRA-OCULAR SYRINGING IN CATARACT EXTRACTION, with a report of fifty-three operations, by J. A. Lippincott, B. A., (Dalhousie) M. D., Pittsburg, Pa., U. S. A., pp. 19. Reprint from Trans. Medical Society of the State of Pennsylvania. This extremely interesting paper contains drawings of very delicate and ingenious surgical instruments invented by Dr. Lippincott, one of the most successful Nova Scotians who do credit to the country abroad.

SELECTIONS FOR GERMAN COMPOSITION, with notes and vocabulary, by Charles Harris, Professor of the German Language and Literature, Oberlin College, pp. VI. + 143, 5in. x 7in. Cloth. (Boston, U. S. A., D. C. Heath & Co., publishers, 1890). Typography superior. Pages 11 to 25, German originals with English paraphrase. Pages 25 to 57, easy narrative selections. Pages 57 to 75, letters. Pages 75 to 94, biographical, historical and descriptive selections for translation into German—the whole well annotated. Pages 99 to 138, vocabulary. Pages 138 to 143, list of strong and irregular verbs.

P. Terenti Afri PHORMIO, and P. Terenti Afri HEAUTON—TIMOROU MENOS; texts with stage directions, the first by Frank W. Nicolson, A. M., and the second by John C. Rolfe, Ph. D., Instructors in Latin in Harvard University. Prepared for use in sight reading. Paper, pp. 66, 7in x 5½in. (Boston, U. S. A., Ginn & Company, 1890). Typography superior. Prepared for sight reading in Freshman Class at Harvard. Just what is wanted for the advanced Latin in our best academics, where there is time enough for proper drill. The plays are good ones for acting, and acting is the best way to master the Latin idiom.

OPEN SESAME; poetry and prose for school-days. Edited by Blanche Wilder Bellamy and Maud Wilder Goodwin. Vol. II., arranged for boys and girls from ten to fourteen years old, and Vol. III. arranged for students over fourteen years. (Boston, U. S. A., Ginn & Company, 1891). Fine print, good selections, the "loyalty section" of which is more especially adapted to the United States, but there are masterpieces, representing many phases of literature, dramatic and narrative, epic and lyric, political and domestic.

Q. CURTI RÆI HISTORIARUM ALEXANDRI MAGNI MACEDONIS, edited by Harold N. Fowler with an introduction on reading at sight by Jas. B. Greenough; paper, about 100 pages. Publishers, Ginn & Co., Boston. The admirable introduction on sight reading should be in the hands of every teacher of Latin.

THE "Three Blind Mice Calendar" published by C. W. Bardeen, Syracuse, N. Y., price 50 cents, is one of the best hits in calendar publishing that we have seen.

BOOKS RECEIVED.

PHILOSOPHY OF AMERICAN LITERATURE, by Greenough White, A.M.; GOOD NIGHT POETRY, Ginn & Co., Publishers.

Current Periodicals.

The Christmas number of the *Academy*, Mr. Allison, Sackville, was a gem in its way among college journals. Its title page was expensively designed, and the contents creditable to its editors, and to the University. The *Centinel*, Halifax, independent in politics, but a "Gladstone Britain" to the core, besides being a good general weekly, has offered capital editorial notes. The *Academy*, *Academy*, both annual and quarterly, ranks among the best of college exchanges. The *Academy* is becoming more than a college newspaper, although its three departments of the University to report from. Its reports of localities seem worth more than its annual cost to the lawyer who would disdain to read ordinary university literature. *The Cosmopolitan*, New York, Henry George begins a series of articles on "Australia." No. 1 is very interesting and entertaining. "German Student Life," "Education in Public Spirit," its "Review of Current Events," are well written. *The Cosmopolitan*, announced in December that it had reached a circulation of 50,000. It is admirably illustrated, and its articles well written. *World*, Boston. All the stories, poems and pictures of this magazine of a high order, and it is unusually attractive. "The Wolves of St. Gervais," the opening story, and Boston's Girl Sculptor are of special

interest. *New England Magazine*, Boston. The illustrated article on "Rites," from a literary and historical view, is one of the greatest interest to read. *The Education of the M. C.* has many articles of special interest to teachers, such as "The Teaching of American," "The Axiom of the Elementary History and General Education." The latter is admirably in its suggestions on teaching that or any other branch of history. *The Education of the M. C.* is a striking feature for the month. Its subjects from Italy and its long expected memoir. A sketch of Italy and its history. *Whitely*, Red, prepares the instalment. *St. Anthony*, has a very interesting "Lack of Reading" by Charles Dudley Warner. *The Education of the M. C.* "The Great Industrial School" with others. *The Education of the M. C.* Boston, began its one hundred and twenty-fifth issue with the number for Jan. 1st. This standard work is published every year to readers who wish to work in the field of literature and science. *Gardner*, New York, begins its new year with promise of greater interest to readers and contributors than ever.

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The Calendar for the Session of 1890-91 contains information respecting conditions of Entrance, Course of Study, Degrees, etc., in the several Faculties and Departments of the University, as follows:—

FACULTY OF ARTS—(Opening Sept. 15th, 1890).
DONALDA SPECIAL COURSE FOR WOMEN—(Sept. 15th).
FACULTY OF APPLIED SCIENCE—Civil Engineering, Mechanical Engineering, Mining Engineering, and Practical Chemistry. (Sept. 16th). Increased facilities are now offered in this

Faculty, by the erection of extensive workshops, which will be ready for this session.

FACULTY OF MEDICINE—(Oct. 1st).
FACULTY OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE—(Oct. 1st).
FACULTY OF LAW—(Oct. 1st).
McGILL NORMAL SCHOOL—(Sept. 1st).

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GAGE & WILLIAMS' NATURAL SCIENCE.

Elements of Physics (Gage), Introduction to Physical Science (Gage), Introduction to Chemical Science (Williams), Laboratory Manual of General Chemistry, (Williams).

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"I cordially recommend the adoption of Williams' Chemical Science in secondary schools." A. Ogilvie, Gordon's College, Aberdeen, Scotland.

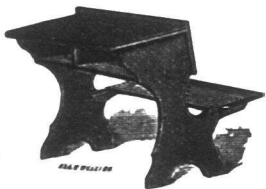
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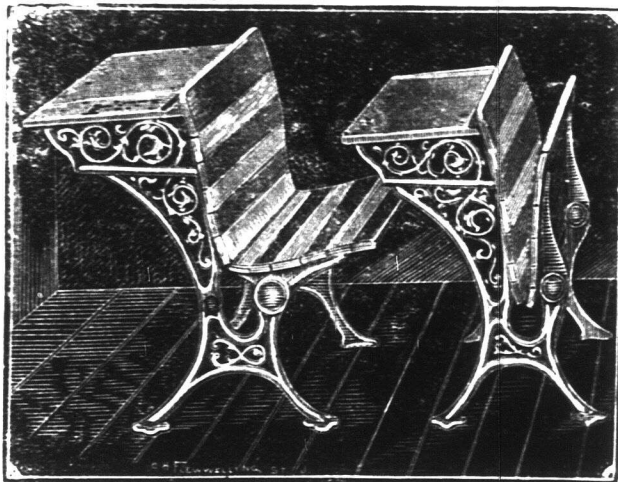
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