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MISSING

The Educational Review.

Devoted to Advanced Methods of Education and General Culture.

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Our new fall and winter stock will be in about 1st September, and we will consider it a pleasure to send samples of any line of goods you may require.

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Yours truly,

DANIEL & ROBERTSON.
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(Please mention this paper.)

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"The Church of England in Nova Scotia and the Tory Clergy of the Revolution" is the title of a work to be published this fall by Rev. Arthur Wentworth Eaton, of New York.

EDUCATIONISTS will generally regret to learn of the retirement of Rev. Dr. MacNeil from the presidency of St. Francis Xavier College at Antigonish. Under his charge the college has risen to a position of influence in the province. Strong efforts were made to retain the genial and learned president; but the claims of the church for his services were the strongest. He was presented with a most appreciative address, accompanied by a purse of three hundred dollars from his fellow citizens.

INSPECTOR MERSEREAU is visiting the schools of Restigouche this month.

At the recent meeting of the North American Volapuk Association, at Chautauqua, N. Y., a paper was read by H. C. Creed, M. A., of the N. B. Normal School, on "Volapuk in the School." He favored its being generally taught as a valuable alternative language in the bi-lingual study of language, and also in order to supply pupils with an easily acquired means of direct communication with people of whatsoever nationality. The day of this phase of Volapuk's adoption is, he predicted, not far distant.

W. TYNG RAYMOND, of Hampton, N. B., a recent graduate of the N. B. University, has won a \$300 scholarship at Harvard, securing first honor place in ancient classics among a large list of competitors.

THE St. John Exhibition opens on the 23rd Sept., and remains open until the 3rd October. The management is making every effort to ensure success, and with favorable weather there will undoubtedly be a large influx of visitors to the city during the ten days that the Exhibition is open.

The Nova Scotia Provincial Exhibition will open in Halifax on the 29th September and remain open until the second of October. By reference to the advertisements in another column it will be seen that there are many attractions to tempt visitors. It is to be hoped that arrangements will be made by which a large number of school children may have the opportunity to visit these exhibitions. No better opportunities could be given, than by these exhibitions to make pupils acquainted with and to have a pride in their country and its resources.

N. B. NORMAL SCHOOL.

THE N. B. Normal School was formally opened on the 9th Sept. Out of 227 who presented themselves for examination 211 passed. These with 18 in the French Department make a total of 229. On examining carefully the questions for matriculation which will be found in another column, it certainly seems a very good record for the schools of the Province when with such a fairly severe test so few failures occurred.

In the address at the opening Principal Mullin reviewed the work of the school for the past twenty years in which free schools had been in operation in the province. During that time 4,163 teachers had graduated from the English department, while the French department had sent out 368 teachers qualified to teach both English and French, making a total of 4,531 in the twenty years, or a yearly average of 227. The attendance for the last four years had been: For 1887, 196; for 1888, 224; for 1889, 239; and this year, when all the students were in it would be about 270. Dr. Harrison and Dr. Inch, chief superintendent of education, also addressed the students, welcoming them to the institution and tendering them best wishes for success in their studies.

THE CENSUS AND SCHOOL STATISTICS.**NOVA SCOTIA.**

Taking the figures for the summer terms of 1880 and 1890, when annual figures are not given, we find that the registered pupils increased nearly 12 per cent., a much better showing than the increase of population according to the census figures just published. Assuming the census to be correct, it means that a greater proportion of the population is enrolled as pupils now than then. The grand total attendance increased over 15½ per cent., which shows that not only is a greater proportion of the population attending school, but the attendance is more regular. The schools in operation have increased nearly 24 per cent., which means a great extension of school privilege during the decade. The increase of government expenditure in aid of the public schools has been nearly 19 per cent. But the total expenditure from the school section to the government has increased even more rapidly, over 27 per cent., which shows that the people are pleased to spend more money in the education of each pupil than ten years ago.

The teachers have also increased more rapidly than the population, making a gain of about 23 per cent. But strange to say the male teachers decreased nearly 18 per cent. Is he destined to become extinct? He numbers in 1890 only 558 out of 2,287—less than 1 in 4. The female teachers increased during the decade over 47 per cent.

County Academy headmasters or "A" teachers increased over 39 per cent. Good! Male "B" teachers decreased, however, nearly 22 per cent. Bad! But to balance, female "B" teachers increased 168 per cent. "A" and "B" male and female teachers have on the whole increased over 7 per cent, which means a backward movement in the higher grades, the teachers as a whole having increased about 23 per cent. This should not continue. It means that education does not pay so well in the profession of teaching as in other professions.

And lastly, let us look at the drift in salaries. The male "B's," though growing less in number, prove their value by receiving an increase of 12 per cent. The female "B's" not only are held in lower value, but have fallen by competition about 6 per cent in salaries.

Male "C" teachers depreciated 5 per cent. while female "C" teachers maintained the standard of ten years ago, and in fact stand better by 1 per cent. Nearly the same holds true of grade "D" teachers—salaries of males depreciate 6 per cent, while females make a gain of a ½ per cent. This looks as if the male teachers of grade C and D are not so efficient compared with female teachers, as they were ten years ago. Are they not—many of them—becoming more disposed to make teaching a stepping stone to something else? If so, the tendency is in the wrong direction, although it might possibly be due to a material prosperity somewhere else which holds out the prospect of greater remuneration for effort made. On the whole, the progress in educational matters is much beyond the progress in population given by the census, as reported to date.

NEW BRUNSWICK.

Accepting the recent census report of the Province of New Brunswick as correct, it will be seen that the gain in population has been much smaller than the increase in the school enrolment.

In 1871 the population of this Province was 285,594, and in 1881 the population had reached 321,233, or a gain of 12.48 per per cent.

In 1891 the population was only 321,294, or a gain of .02 per cent.

The number of pupils enrolled during the first term of 1870 was 31,487, and for the corresponding term of 1880 it was 50,308, representing a gain of 60 per cent. The enrolment for the first term of 1890 was 58,570, or a gain of 16 per cent

The number of schools in 1870 was 837; in 1880, 1,283, and in 1890, 1,517, a gain during the first decade of 53, and for the second of 19 per cent.

The teachers have multiplied as rapidly. For the

first year quoted there were 854 teachers; for the second, 1,333, or a gain of 56 per cent., and for the third, 1,617, or an increase of 21 per cent.

In 1870, one person in every 8.92 was in school; in 1880, one in 5.67; and in 1890, one in 5.49.

The Provincial Government in 1870 spent \$93,794.66 upon the education of the youth in the public schools of the Province.

In 1880, \$147,159.55 was spent, a gain of 57 per cent. In 1890, \$157,062.31 was spent, a gain of 7 per cent. In other words during the last decade whilst our schools increased by 21 per cent., the increase in the government expenditure was much less.

It might be asked whether our provincial rulers are pursuing the wisest course in thus administering the educational affairs of New Brunswick.

It was found impossible to obtain any data with regard to the local support for the year 1880. In 1870 the people of the Province spent \$117,931.63 exclusive of the government aid.

In 1890 the sum spent under local control reached the magnificent sum of \$278,140.83, or 136 per cent. of the amount furnished twenty years earlier.

Our school enrolment is yet too small, our average daily attendance is too low, and the support guaranteed for very many of our schools outside of the more populous districts is much below what it should be.

A good compulsory act would remedy the first evil. It remains with the teachers themselves to make their influence so felt by the good that they do that they may compel the ratepayers of the Province to recognize their services in a tangible manner.

KINDERGARTEN WORK.

A meeting of the Nova Scotia "Fröbel Institute" was held in the convocation room of the Halifax County Academy on the fifth of September. Mrs. Hinkle Condon, the president, gave a very interesting account of what she observed in her travels with particular reference to Kindergarten work in England, of which work she exhibited many interesting specimens. Mrs. S. S. Harriman, of Brooklyn, New York, the principal of the Halifax Normal Kindergarten School was present, as was Miss Hamilton, of the Dartmouth Public Kindergarten. A remarkable development of the Kindergarten system has taken place in the Province since Mrs. Condon, as President of the Fröbel Institute, pressed the matter on public attention. Under the guidance of Supervisor McKay, the greatest step yet has just been taken. For the school commissioners are just opening a department for the training of teachers by Mrs. Harriman,

for the public schools of the city. The towns of the Province, we hope, will not be long behind. Selby & Co., of Toronto, as can be seen from our advertisement, are able to supply promptly all Kindergarten material which may be required.

TEACHERS' INSTITUTES.

Northumberland County Teachers' Institute meets on the 17th and 18th of Sept., at Newcastle. The following is the programme. Thursday—1st session, 10 a. m.—Enrolment of members: Election of officers; How to teach best the matter of prescribed book on Temperance.—Miss A. G. McIntosh. 2nd session, 2.30 p. m.—Drawing from objects.—Miss Hickey. What can be done to increase parental interest in the school.—A. K. Neales. Friday.—3rd session, 9 a. m.—The best means of teaching geography of a country.—G. H. Harrison. Is social culture properly emphasized in our schools?—Miss M. Miller. 4th session, Simultaneous recitation—Its advantages and disadvantages.—Inspector Mersereau. Is it found by experience that the order of Arithmetic in Grades V. and VI. is best educationally and practically?—Philip Cox, A. M.

The Charlotte County Teachers' Institute will meet in St. Stephen, on the 24th and 25th Sept. Chief Supt. Inch and Inspector Carter will be present and take part in the proceedings.

The Restigouche County Teachers' Institute will meet at Campbellton, Sept. 24th and 25th. A public Education Meeting will be held on the evening of the 24th, to be addressed by Chief Supt. Inch. Papers will be read at the Institute by Mr. C. H. Edgett, on The Teacher, by Miss Helen T. Galt, on Science (with practical lesson), by Miss Turvey, on Regularity of Attendance, by Miss McKinnon, How to Teach Current Events, by Miss Doyle, on Home Lessons, by C. P. Steeves, A. B., on Text Books. In addition to the above lessons will be given on Arithmetic, by Miss Kerr, on Square Root, by Mr. C. H. Edgett, on Music, by Miss Barnes, on Writing, by Miss Thompson.

The Gloucester County Teachers' Institute will meet at Caraquet this month.

The St. John County Teachers' Institute will meet in St. John, on Thursday and Friday, the 17th and 18th Sept.

THE LARCH SAW FLY (*Nematus Enichsonii*) reached Halifax and Antigonish last summer, as we predicted and reported. This season the larches in these regions are nearly completely defoliated. Many if not most of the trees will die before next year. The fly is likely in Cape Breton by this time, although it has not been reported. (For figures and history of this fly see EDUCATIONAL REVIEW, September 1890).

FERNDALE SCHOOL.

SOME FLIES.

Flighty, fitting, fluttering fly!
Whence, and whether, and how, and why?



THE OX GAD FLY.—(Magnified.)

TEACHER.—We have studied this fly before. (ED. REV. Jan., 1888 and Jan. 1890.) From the enlarged drawing you can make out the three parts of its body.

SCHOLARS.—The head, the thorax and the abdomen.

T. The two wings and six feet are attached

S. To the thorax.

T. It belongs to the order *diptera*, we know from

S. Its having only *two* wings—*di* standing for *two* and *ptera* for *wings*.

T. Two small, club-shaped objects, the rudiments of another pair of wings are seen behind the wings. You remember we called them "balancers," because we could scarcely imagine any other satisfactory use to which they might be put.

JACK.—But many flies have *four* wings. Perhaps the balancers are only a hind pair broken off.

T. But then you see that the *four winged* flies—the *Hymenoptera*—never become two winged by breaking off a pair of wings. Who ever saw a two winged bee, or wasp, or sawfly? And then the "Daddy-long-legs" has a pair of balancers behind his two wings so long that they do not look like the base of wings at all.

THE HOUSE FLY.—(*musca domestica*.)

There are plenty house flies about in August. You can all get specimens, and no one will complain of your cruelty to them, considering how cruelly they tease us. What differences do you notice between the house fly and this figure?

S. The three parts of the body are very much more distinctly separated,

T. The wings

S. Are differently veined.

T. The "balancers"

S. Are scarcely noticeable.

T. The skeleton of the fly, like all insects, and like the lobsters, is its outside covering.

S. Is the hard covering thin bone?—it looks blackish.

T. No. It is more like a thin sheet of horn, and called *chitin*—pronounced like *ki-tin*.

S. The thorax of the fly is made then of a tubular piece of chitin.

T. There are no less than 51 different pieces of chitin, jointed together in the thorax and each has its name. But we will leave the finer anatomy of the fly until you wish to take it up in college, or when you have leisure. Small, strong muscles run up from the firm shell of the thorax to the base of the wings, which give them the motion necessary for flight.

S. How fast can they move their wings?

T. Faster than a boy can his arms.

S. Yes. A boy can hardly move his arms like a wing faster than once per second.

T. Very good. By very interesting experiments it has been shown that the house fly may move its wings nearly 600 per second. It generally flies about five feet per second; but when alarmed can go 30 or 35 feet per second—one-third of the speed of a swift race horse.

S. And how many little eyes are there in its two great compound eyes? You told us there were a great many.

T. About 4,000. But like the number of strokes of the wing, you can hardly realize it. When we get our school microscope we will have a look at these small eyes and at some other things about the fly, and you will all have to draw what you see. One thing more, let us try to see. How the fly eats.

S. I see it stretch out a sort of a trunk with a broad end.

T. Yes. It has no biting parts in its mouth. Only a trunk through which it can send down a liquid if necessary, and then suck up its food when it is dry. This trunk we shall examine when we get our microscope, and we shall see then who can make the best drawing of it.

LIFE HISTORY OF THE HOUSE FLY.

JACK.—Why are there so many house flies during this hot weather, and where do they all come from?

T. A very good question. They are more numerous in some places than in others, and there is a reason for it, don't you think?

S. Yes. There is a reason for everything.

T. To be brief. There is first the "egg" stage. The female fly deposits, according to one authority, about 120 eggs altogether, according to another 70 or 80, four times in its life time, on decaying matter, preferably on stable manure.

S. That is why there are so many in houses near stables? Can the eggs be seen with the naked eye?

T. They can. They are long, oval-ended, white objects, about one-twentieth of an inch in length and one hundredth in breadth.

S. That is, one square inch could contain 20 rows of 100 eggs placed side by side.

T. Correct. In one day perhaps, the egg is hatched by the heat, and the larval stage commences.

S. It is then a maggot?

T. Yes, and only half as long again as the egg — seven one-hundredths of an inch. But in one day it grows too big for its jacket and moults, that is, casts off its old skin; and for the next day or two it is from two to three times longer than on the first day. It then moults again, and in three or four days becomes over one-third of an inch in length. About the seventh day the maggot contracts into an oblong mass shaped like a grain of rice or wheat, less than a quarter of an inch long. Its skin hardens into a case called a puparium of a dark, reddish-brown color.

S. Is a puparium a cocoon?

T. Not exactly. The cocoon is a covering spun by the insect. The pupa of a fly is contained in a puparium instead of a cocoon. About two weeks from the time the egg is laid, the fly, pale, with short, baggy wings, pressed close to its sides, shoves off a lid on one end of its puparium, and in an hour or so in the air becomes a full grown fly.

S. It goes through all its changes, then, in two weeks. An egg one day, a maggot with three moults, for a week, and a pupa for another week; then a fly for — how long?

T. Perhaps some manage to hibernate during winter and crawl about next summer. But nearly all die from various causes before or during winter time. In very hot weather the transformations may be more rapid, and in cool weather slower than the average time you have just mentioned. The fly does not die after depositing eggs as many insects do. It is generally thought to deposit eggs three or four times in one season, which explains the great numbers which may exist during the end of the hot season.

OTHER FLIES.

S. Some flies look very much bigger than others — the one called the Blue-bottle, for instance.

T. There is some difference in the size of house flies, due to the abundance of food when in the maggot stage. But growth is complete in an hour or two

at least after emerging into the air from their pupal cases. The Blue-bottle fly, and others, are all different species, although they look so much like the house fly.

S. How many different species of flies are there.

T. Entomologists say there are at least 24,000 in the world, and 10,000 in America alone. Of these 3,000 American species are described. So there are plenty chances for new discoveries, and an entomologist has a very good opportunity to make himself famous. Many of the species are extremely small — such as sand flies, for instance.

S. Mosquitoes, gnats, midges, gad flies, gall flies, and all of this order of the *Diptera* are hurtful, are they not?

T. Those you mention are noxious enough. But there are some useful ones among them, such as some of the *Syrphus* and *Tachina* flies whose larvae are destructive to noxious insects.



Here we have a figure of the Syrphus Fly (*Heliophilis latifrons*) and beside it the maggot larva seizing and destroying an aphid (one of the plant lice).



Here we have figured the Red Tailed Tachina Fly (*Nemoræa leucaniæ*) in its three stages, with, below, a portion of an Army Worm. This fly searches for the Army Worm, then deposits five, or more, of its eggs on the back of the caterpillar, near its head where the worm cannot reach with its jaws to displace them. The larvae of the fly when hatched enter into the body of the caterpillar, feed upon it; and Howard, the entomologist, says that he searched for hours in a field infested with army worms or caterpillars and that he did not discover one full grown caterpillar which had not one or more of these eggs on its back. This illustrates how insect plagues often come to an end.

JACK. Wouldn't that be the best way to get rid of potato bugs and other insects which we have to destroy ourselves.

T. Quite correct. There is nothing so economical as making the insects fight each other. It is not always we can get the better fighters on our side however. Sometimes we can; but the story is important enough for a lesson at some future time.

Fractions.

In our schools too much time is given to arithmetic, — and too little is known about the subject when we are done. The reason is, to a large extent, that we do not base our work on sense-perception; we deal with symbols that symbolize nothing. We manipulate figures with little regard to numbers. With many a man, what he knows of figures, he has learned at school; what he knows of numbers, he has learned on the play-ground, and in contact with things and affairs,—in spite of the schools.

Many pupils find fractions the most difficult subject in arithmetic. There is no good reason for this; if the conceptions of fractions are gained from sense-perception, they should present no great difficulty to one who has properly learned integers. In fact, he will find little or nothing in fractions that is really new.

I propose to illustrate these statements by a few brief examples.

Fractions are not "broken numbers;" there is no such thing.

A number is one, or a collection of ones of the same kind.

A fractional number is a number of relative ones, smaller than some primary unit to which their relation is expressed. For instance, four-fifths of an apple is *four* with all the properties and characteristics of any other four; but it is four whose relation to the primary unit — *one apple* — is such that it takes five of the fractional ones to make the primary one. This fact, and the similar fact in regard to any fraction, a child can be made to see clearly by illustrations with objects.

I have found silver coins good objects to use in this work; children are interested in them, and they are not perplexed with any thought of some supposed troublesome "division." Show the child 3 quarter-dollars; ask, "How many such would make a dollar?" Let him write the figure 3 and see that it answers the question, How many? Now teach him to write 4, the number of units of this kind which it takes to make a whole, under the 3, separating them by a short horizontal line. The four answers the question, "What kind?"

Adhere strictly to the view of a fraction thus developed. The child will thus come to understand that the *numerator* of a fraction expresses the number; and that the denominator is simply a "modifier" of the numerator in showing the relation of these ones to a primary one.

Now, how easy to show that increasing the denominator diminishes the value of the fraction, while diminishing the denominator increases the value of the fraction. By the use of objects, this can be made perfectly clear to any bright seven-year-old.

So, it will be easy to show that the value of the fraction is unchanged when both numerator and denominator are multiplied or divided by the same number.

Take $\frac{3}{4}$ of some object. A cake I used recently.

Let the child write the fraction $\frac{3}{4}$ on paper, or on the slate. Break each of the three pieces in halves. Let him write the new number of pieces, 6; lead him to see that it will take twice as many of these pieces to make a whole; then to write the new denominator, 8. He knows that he has had the same quantity of cake all the time.

Take $\frac{3}{4}$ of some object,—a paper circle, for instance. Fasten the pieces together by 4's; he now has 2 pieces. Get him to see that 3 such pieces would make a whole; he can now write the new fraction, $\frac{3}{4}$. When, through exercises of this kind judiciously presented, he grasps the truth, he knows all about "reducing fractions to their lowest terms." If the terms of the fraction are large, it is well to resolve them into their prime factors. The pupil should have learned to do this readily, as in the following example:

$$\begin{array}{r} 2835 \quad 5 \\ \hline 3402 \quad 6 \\ 2835 = 3^2 \times 3^2 \times 5 \times 7 \\ 315 \\ 35 \\ 3402 = 2 \times 3^2 \times 3^2 \times 3 \times 7 \\ 1701 \\ 189 \\ 21 \end{array}$$

Resolving, as above, and rejecting common factors, there remain 5 in the numerator and 2 and 3 in the denominator; hence the result is $\frac{5}{6}$.

To change a mixed number to an improper fraction, take the example $5\frac{2}{3}$. Here are two unlike numbers 5 and 2 to be added together. We can make them alike by changing the 5 to thirds. As there are $\frac{2}{3}$ in 1, in 5 there will be 5 times $\frac{2}{3}$ or $\frac{10}{3}$. Now, the result is $\frac{10}{3} + \frac{2}{3} = \frac{12}{3}$. Let the pupil do this by taking 5 objects and cutting them up into thirds, etc. If the work is done without objects, be sure that he says "5 times $\frac{2}{3}$," do not allow the multiplication of 5 by 3.

The opposite process is quite as obvious. Take $\frac{12}{3}$ of some object, and find how many wholes it equals. Of course, as $\frac{2}{3}$ make a whole, there will be as many wholes as there are times $\frac{2}{3}$ in $\frac{12}{3}$.

But suppose we are to change a mixed number to a fraction having a given denominator, as $8\frac{3}{7}$ = how many sevenths? In order that the parts may be made into sevenths, we must cut each of the present 8 parts into 7 equal pieces; this will give us $\frac{56}{7}$. Every 3 of these 21sts will make one seventh; hence, we shall have

$$\frac{18\frac{3}{7}}{7}$$

This is the process if we use objects. If we use figures only, we may say, "I have $8\frac{3}{7}$; but I want an equivalent fraction whose denominator shall be 7. Multiplying the present denominator by $2\frac{1}{2}$, we have 7, and multiplying the numerator by the same number, we have

$$\frac{18\frac{3}{7}}{7}$$

as before.

—Public School Journal.

Astronomical Notes.

SEPTEMBER 15 TO OCTOBER 15.

Morning star-gazers will have a fine chance to get acquainted with *Mercury* this month. Greatest elongation happens on September 28, and it is a very good one. Mercury then is nearly twice as bright as at last greatest elongation in August; and is above our horizon, while the sun is below it, for nearly twice as long. There should be little difficulty in catching him about a week before the 28th, and holding him for a fortnight or more after that date. On the 28th he will be due east and about 9° high fifty minutes before sunrise. On October 1 he will be near the moon, and on October 3 very near Saturn. Try whether it is easier to see Mercury or Saturn on the morning of the 3rd.

Venus passes from the west to the east side of the sun on September 18 and becomes an evening star. If any one sees her with glass or with eye before the middle of October, I hope she or he will send me word. She has been seen with the naked eye twenty-six days after superior conjunction.

Mars is far-off and faint, but those who get up in the morning to look at Mercury may manage to see him, too. During the last three or four days of September he is about 2° west of Mercury. On the morning of October 13 Mars and Saturn will be near each other.

Saturn is a morning star, too, and is too near the sun's place in the sky to be easily seen. He is worth noting, however, because of his conjunction with Mercury on October 3, with Mars on October 12, and the disappearance of his ring on September 22. The date of the last disappearance was February 6, 1878.

Uranus is still evening star, but is beyond the reach of eyes and field-glasses.

JUPITER is "hidden at the beginning of the month" (September) according to almanacs prepared for Halifax and St. John. Hidden "behind fog," I suppose the compiler means. To places with a clearer celestial outlook than these two unfortunate cities have, Jupiter has been at his best and brightest "at the beginning of the month;" not only his brightest for this year, but for a dozen years back and another dozen to come.

He is still retrograding, moving to the right among the stars. To-day (Sept. 6) he is passing less than a quarter of a degree above λ Aquarii. On the

evening of October 3 he will be a little more than a degree below λ Aquarii.

During the last two or three weeks I have received reports from several field and marine glasses that have shown sometimes two and sometimes three of Jupiter's moons. Three were seen very distinctly on the evenings of August 20 and 22. On the former evening our moon, only a day beyond the full, was less than 5° away from Jupiter; but she could not prevent the little dots of light from showing up close under Jupiter's wing. Just at present there are several small stars close to the planet, and one needs to have a little experience at the business before he gets out of the habit of mistaking these for the jovial satellites. You should make a note of this, and also of this other fact, that, at times, all the four satellites cannot be seen with even the largest telescope. Sometimes only three are visible, sometimes only two, sometimes one only, and sometimes none. On the evening of September 17 only three will be visible until after 10 (60° time). Other dates for three only are: September 20, 10.36 to 12.54; September 21, 7.53 to 10.34; September 22, 8.30 to 11.21; September 24, after 10; September 28, 9.38 to 12.29; September 29, after 10.47. (The hours are all 60° time.) In this longitude the only chance to see only two, between now and the middle of October—I mean, of course, with an instrument able to show all four when out—will be on the evening of October 6. Between 8.33 and 10.51 both No. 1 and No. 4 will be creeping across Jupiter's face; No. 2 and No. 3 will be out on the right, No. 2 close up to the planet. (For a field-glass, read "left" instead of "right.")

Only one moon visible is a rather rare phenomenon, and none at all is still rarer. Only one, and very nearly none, happened on July 15 last. No. 3 passed off the face of the planet at 3.52 in the afternoon. No. 2 was then behind the planet. At 3 minutes past 6 No. 1 began to creep across the disc, and 15 minutes later No. 4 followed suit. No. 2 did not come out from behind Jupiter until 7; so, from 6.18 until 7, No. 3 was the only one of the four that was visible; and if he could have been held back for two hours and a half, there would have been four minutes during which Jupiter would have appeared without a single attendant. We were too far west to see anything of this.

The total disappearance of all the satellites has been observed six times this century: In 1802, 1826, 1843, 1867, 1874, 1893. There is an astronomy book—and an excellent one of its kind—which was published in 1844, and which tells us that this phenomenon happens only once in three thousand billions of years.

Vesta's motion among the stars in Sagittarius can still be watched with a glass. On September 26 she will pass less than half a degree below Lambda; on October 14 she will be the same distance north of Sigma. If you see her as late as this, you may then say good-bye to her until October next year.

With a good field-glass, and a knowledge of where to point it, you can see *Pallus, Juno* and *Neptune* now.

The September moon will run highest between 6 and 6.30 (mean time) on the morning of September 25.

The October moon will run lowest at 5 in the afternoon of October 9.

At sunset on October 3 the moon will be 21 hours old. If you know whereabouts in your sky Theta Virginis (or any other star having the same declination) is situated half an hour before it sets, point your glass towards that spot at the above time, and you may see this very young moon.

A. CAMERON.

Yarmouth, N. S., September 6th, 1891.

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

THIRTEENTH PAPER.

HISTORICAL NOTES (CONCLUDED.)

The great victory for the Tonic Sol-faists was in 1867. The officials of the Paris International Exhibition offered a prize of £200 and a gold wreath. The English Tonic Sol-fa choir was disallowed *after* the contest, because the sopranos and altos were ladies; but their singing was so superior that the Emperor, in the midst of an assemblage of 20,000, presented them with a prize equal with the first when the little choir received the men's voice prize from the hands of the Empress. A gold medal and certificate was also presented to the choir, and to Mr. Proudman, the conductor of the choir, a gold medal, a diploma and the badge of the Orpheonists of France. After their return to England, Mr. G. A. McFarren, who was always unfavorable to the system, heard the choir singing, and in his address said: "It has long been a custom to ignore abroad and at home the musical capacities of the English people. I am very proud to find that our musicality has been so ably vindicated, and that not by practised artists of great repute, but by the members of the community at large, who have not shown more individual talent, but the general talent of the English people. I am sure that the singing to-night must have satisfied everybody of English capability." The same year Mr. McFarren composed an anthem to be sung as a sight

test by 4,500 adult singers. He said the singing was such as to satisfy the most severe critic, and that it was to the remarkable reading and not the music that the great applause was due, and that he was proud to have been concerned in this admirable display of musical skill.

In 1871 the Tonic Sol-fa association held its first concert of children holding the elementary certificate, and Mr. Henry Leslie wrote a part song for the occasion, which was read at sight. The critics unanimously testified to the correctness of the rendering.

Miss Glover died at Malvern, 20th October, 1867. Mr. Curwen made many modifications on her system, some at least of which she did not think improvements; but there was always the most friendly intercourse between the founders of the system. Very shortly before her death, on Mr. Curwen's last visit to her, she said to him: "You not only do me justice, but you try to make me famous." This same year the Tonic Sol-faists had their attention turned to Mr. Hallah's examinations in connection with the Society of Arts in Musical Notation, Nomenclature and History, but all expressed in the Staff Notation. They entered the lists and obtained 54 per cent. of the certificates granted, and 10 out of 12 of the first-class certificates. In five years they obtained 9 out of 10 prizes and 217 out of 328 certificates. At the request, and at the expense of the Sol-faists, these examinations were resumed for three years, under Mr. McFarren, ending 1871. The candidates were now allowed to give their answers in either notation. The Sol-faists took 3 out of the 4 prizes granted and 135 out of 143 certificates.

In the year 1867 a Tonic Sol-fa composition club was formed.

In 1868 a new certificate, the members coming between the intermediate and advance, was issued, and the holding of at least this certificate was required for membership of the Tonic Sol-fa college, which was organized in 1869. This year Mr. Curwen requested the government to allow music as one of the extra subjects for which a grant of 1s. 4d. could be earned in the schools under inspection. Further, as for six years large concerts had been given at the Crystal Palace by the Tonic Sol-fa Association and other societies, as Bands of Hope, Ragged Schools and Reformatories used the notation, and as it had entered into a number of normal schools, as the principal church music books of all denominations in England, Scotland and Wales were printed in this notation and largely used, as there were 3,000 teachers of the system, and harmony and composition had been

successfully studied in it in connection with the Society of Arts, and 16,000 pages of music were printed in it, that school inspectors should be allowed to treat instruction in it as a systematic instruction in music. Mr. Forster wrote to Mr. Curwen that all was granted. Many attempts have since been made to displace the notation. However, in London, the stronghold of the staff notation, the chairman of the School Board said in 1886 that in every school and in every department music was taught by note, and in all these departments except one by the Tonic Sol-fa notation.

The present position of the system in Great Britain is indicated by the returns of the education department just published :

Average number of pupils in schools inspected	4,230,607
Number taught singing	4,210,678
“ “ by ear	1,324,027
“ “ by note	2,886,567
“ “ by Tonic Sol-fa	2,509,567
“ “ by other notations	377,083

Thus seven children earn the grant in Tonic Sol-fa notation for every one in staff and other notations.

Up to December, 1868, the number of advanced certificates granted was 100. Up to 1874 the issue of certificates was: Elementary, 127,000; intermediate, 28,000; members, 1,469; advanced, 316. By 1882 the numbers had reached: Elementary, 153,375; intermediate, 37,764; members, 2,000; and advanced, 492. The present issue of certificates of all kinds is about 25,000 a year.

Again the literature indicates the spread of this notation. Every type founder who deals in music type now keeps a Tonic Sol-fa music font. Every music printer, and many music printers who have no music type, produce anthems, oratorios, part songs, and children's pieces in this notation. The London music publishers nearly all issue Tonic Sol-fa music additions. The firm of Novello has published 9,000 pages of Tonic Sol-fa music, and Curwen's catalogue of music is a pamphlet of 50 pages, 9½ by 7½ inches, in small type.

Mr. I. S. Curwen says Tonic Sol-fa has now spread to all parts of the world. The universities' mission in Central Africa print our notation excellently. At Toronto and Montreal it is in all the schools. The Kaffirs in South Africa have taken to it greatly. It has been taught on the Nile, and instructions have been printed in Arabic. A Chinese modulator has been produced in several parts of the empire. In Madagascar, out of 1,100 schools, 85 per cent. teach Sol-fa. In all our Australian colonies it is known.

It is taught in Japan and Nova Scotia and the training schools of our Royal Navy. The students of two mission colleges have carried it to every part of the globe. It is taught to the Sioux Indians in Dakota. The Roman Catholics like it because it so well fits the Gregorian system. The Jewish Rabbis use it to help them in the inflectional reading of the scriptures. Its truth and simplicity have caused it to penetrate everywhere. JAMES ANDERSON.

For the Review.]

Grammar School License.

I wish to ask the assistance of the REVIEW in what may be the case of other teachers in New Brunswick: I am a first-class teacher, and have for sometime wished to procure a grammar school license. But the subjects required are so many and the time at my disposal so small that for a year or two I have made but little progress. Then when I shall have completed the course of reading required, I fear that I shall have to begin *de novo* with those subjects I studied first. So that to prepare myself in all the subjects of the grammar school course and at the same time keep them in review preparatory to the final examination, will, I am afraid, make my coveted grammar school license like the fruit which Tantalus desired so much to seize.

Could not the Board of Education so arrange that teachers who are desirous of securing a grammar school license could take classics one year, mathematics another, and so on until all the subjects required were passed. I think such an arrangement would serve as a stimulus to many teachers who would like to study for the highest license attainable.

ADVANCE.

The Census of Canada.

The census of Canada for 1881 showed a population of 4,324,810; the 1891 census gives 4,823,344, an increase of 498,534, or 11.52 per cent. The population of the various provinces is as follows:

Nova Scotia	450,523
New Brunswick	321,294
P. E. Island	100,088
Quebec	1,488,586
Ontario	2,112,989
Manitoba	154,442
Northwest Provinces	61,487
British Columbia	92,767
Unorganized Territory	32,168
Total	4,823,344

Further census returns have been received at the Department of Agriculture from the district of Alberta, which give that district a total population of 26,123, instead of 20,056, as contained in the partially estimated statement furnished to Parliament last week. The increase of population, therefore, for provisional districts in the North-west territories from the returns so far received, is 42,089, instead of 35,972. The percentage of increase is 164.76, instead 140.93, and the total numerical increase for the whole Dominion is 504,601, instead of 498,534; the percentage of total increase being 11.66 instead 11.52.

Nova Scotia shows an increase of 9,951, New Brunswick 61, and P. E. Island 197, the three provinces showing only a little over one per cent. in excess of the last decade. The increase in Quebec is 9.53, Ontario 9.63 per cent. Manitoba gains 148 per cent., the Northwest 141 per cent., British Columbia 87½ per cent., and unorganized districts 4 per cent. Representation in Parliament will not be increased as an effect of this census. According to the returns as given above Nova Scotia will lose one member. New Brunswick two, and P. E. Island one. In Ontario there may be a gain of two members.

The returns for the Maritime Provinces, by counties, are as follows:

NEW BRUNSWICK.

	1891.	1881.
Albert.....	12,523	12,829
Charlotte.....	23,751	26,087
Gloucester.....	24,901	21,614
Kent.....	23,858	22,618
Kings.....	23,094	25,617
Northumberland.....	25,715	25,109
Queens.....	12,152	14,017
Restigouche.....	8,311	7,058
St. John City.....	24,184	26,127
St. John County.....	25,390	26,839
Sunbury.....	5,763	6,651
Victoria.....	18,218	15,686
Westmorland.....	41,484	87,719
York.....	30,979	30,397
Carleton.....	22,523	23,365

NOVA SCOTIA.

	1891.	1881.
Annapolis.....	19,352	20,598
Antigonish.....	16,117	18,060
Cape Breton.....	34,223	31,258
Colchester.....	27,160	26,720
Cumberland.....	34,529	27,368
Digby.....	19,896	19,881
Guysborough.....	17,198	17,808
Halifax.....	38,556	36,100
Halifax County.....	32,865	31,817
Hants.....	22,153	23,359
Inverness.....	25,781	25,651
Kings.....	22,492	23,469
Lunenburg.....	31,077	28,563
Pictou.....	34,550	35,585
Queens.....	10,610	10,577
Richmond.....	14,400	15,121
Shelburne.....	14,956	14,913
Victoria.....	12,390	12,470
Yarmouth.....	22,218	21,284

PRINCE EDWARD ISLAND.

Kings County.....	26,634	26,433
Prince.....	36,471	34,347
Queens.....	45,983	48,111

POPULATION OF TOWNS

of from 3,000 to 5,000 in the Maritime Provinces:

	1891.
Springhill.....	4,873
Lunenburg.....	4,044
New Glasgow.....	3,777

Amherst.....	3,781
Woodstock.....	3,290

TOWNS AND VILLAGES.

Pictou.....	2,999
St. Stephen.....	2,680
North Sydney.....	2,513
Sydney.....	2,426
Milltown, Charlotte.....	2,146
Parrsboro.....	1,909
Kentville.....	1,686
Georgetown.....	1,509

THE CITIES.

The population of the cities of the Dominion is as follows:

	1891.	1881.
Montreal.....	216,650	140,727
Toronto.....	181,220	86,415
Quebec.....	63,090	62,446
Hamilton.....	48,980	35,961
Ottawa.....	44,154	27,412
St. John.....	39,179	41,853
Halifax.....	38,556	36,100
London.....	31,977	19,746
Winnipeg.....	25,642	7,985
Kingston.....	19,264	14,091
Victoria, B. C.....	16,841	5,925
Vancouver.....	13,685	5,000
St. Henri.....	13,415	6,415
Brantford.....	12,753	9,616
Charlottetown.....	11,374	11,485
Hull.....	11,265	6,890
Guelph.....	10,539	9,890
St. Thomas.....	10,370	8,367
Windsor.....	10,322	6,561
Sherbrooke.....	10,110	7,227
Belleville.....	9,914	9,516
Peterborough.....	9,718	6,812
Stratford.....	9,501	8,239
St. Cunegonde.....	9,293
St. Catherines.....	9,170	9,681
Chatham, Ont.....	9,052	7,873
Brockville.....	8,783	7,609
Moncton.....	8,765	5,032
Woodstock, Ont.....	8,612	5,373
Three Rivers.....	8,334	8,670
Galt.....	7,535	5,187
Owen Sound.....	7,497	4,426
Berlin.....	7,425	4,054
Levis.....	7,301	7,597
St. Hyacinthe.....	7,016	5,321
Cornwall.....	6,805	4,468
Sarnia.....	6,693	3,874
Sorel.....	6,669	5,791
Fredericton.....	6,502	6,218
New Westminster.....	6,641	2,700
Dartmouth, N. S.....	6,249	3,796
Yarmouth.....	6,089	6,280
Lindsay.....	6,081	5,080
Barrie.....	5,550	4,855
Valleyfield.....	5,516	3,906
Truro.....	5,102	3,461
Port Hope.....	5,042	5,585

The Song of the Golden-rod.

Oh, not in the morning of April or May,
When the young light lies faint on the rod.
And the wind-flower blooms for the half of a day,—
Not then comes the Golden-rod.

But when the bright year has grown vivid and bold
With its utmost of beauty and strength,
Then it leaps into life, and its banners unfold
Along all the land's green length.

It is born in the glow of a great high noon,
It is wrought of a bit of the sun;
Its being is set to a golden tune
In a golden summer begun

No cliff is too high for its resolute foot,
No meadow too bare or too low;
It asks but the space for its fearless root,
And the right to be glad and to grow.

It delights in the loneliest waste of the moor,
And mocks at the rain and the gust.
Its belongs to the people. It blooms for the poor.
It thrives in the roadside dust.

It endures though September wax chill and unkind;
It laughs on the brink of the crag.
Nor blanches when forests turn white in the wind;
Though dying, it holds up its flag!

Its bloom knows no stint, its gold no alloy,
And we claim it forever as ours—
God's symbol of freedom and world-wide joy—
America's flower of flowers!
—St. Nicholas for September.

The Best American Authority.

Dr. W. T. Harris, United States Commissioner of Education, in his response to the welcome of Canada to the National Educational Association at Toronto said:

We come not as entire strangers, nor indeed as people differing widely in language or in political institutions; on the contrary, we claim close relationship, almost brotherhood as descended from a common mother nation, the great Anglo-Saxon Empress Britannia, ruler of the seas. We are the elder and you the younger offspring of that nation, whose glory in the world's history is that of the invention of local self-government, the greatest political device ever invented by man for the protection of the individual and the preservation of his liberties. Like all contributions to the forms of civilization, this device is not the invention of theoretical thinkers. It is something far deeper. It was born of great national struggles, the collision of races, the Celt, the Saxon, the Dane and Norman meeting in bloody conflict, and the innate stubbornness of each furnishing an element in the four-fold product, the British constitution. The mutual toleration, the sense of fair play, the readiness of all to defend each in the exercise of the prerogative, the profound respect for established law—those characteristics belong essentially to the original people that invented local self-government. We both of us here unite in gratitude towards that common ancestor who is still young in strength and beauty. But we must remember at

this point that you are still living in the old family as an integral part of it. We have long since gone out from that family. But, while no one of us regrets our separate independence, we do not for a moment suppose that we have taken with us all the good things. In studying your own social and political forms we may see that you who still hold fealty to the British flag have preserved much that we may well intimate. Your union of central and local powers is more perfect than what we have yet achieved in the States. Our own history, beginning with a bloody revolution, has always shown a tendency in the people to dread the centralizing power in the government. There is a deep jealousy, even at this late day, of centralized power. The consequence of this has been that we have never evolved that perfect balance between local and central powers. We behold in your Dominion a more perfect balance in this respect than we have been able to attain. We see this in your political government and in your schools. It is a great opportunity that we have, and we rejoice in the opportunity to study and learn from a fresh experiment at local self-government and the preservation of it by common school education.

You too, like ourselves, have your conservative support in the education of the youth, and your movements in this great cause have attracted our attention for a long time. The honored names, honored wherever educational history is studied, the honored names of Ryerson, Hodgins and Ross, stand for us as significant of new departures full of promise in educational methods and organizations. We thank you for your hearty reception; we congratulate you on the liberty and the prosperity which you enjoy within the old national family. May the day when you shall feel a necessity for a separation from that family never come. But let another and different day draw near when all English-speaking people shall form one grand confederation of independent nations—settling all questions of difference by international conferences. On this basis of local self-government there is no limit to the extent of territory that may be united, for, according to its principle, each province, each section, governs itself in all local interests. Only in common interests is there a common authority. Only in supreme concerns does the supreme power interfere. Let us all who have a common share in Runnymede and in Shakespeare, and who love England and Scotland as the home of our ancestry, let us study here the problem of education in the light of our similar social and political problems, being assured that a civilization whose symbols are the railroad, the public schools, and the morning newspaper, shall find in this study the best key to its sphinx riddles and the perplexing issues which the time and spirit offer to our peoples. Teachers and citizens of Canada, we, as your cousins and brethren, thank you." (Great cheering.)

EVERY teacher, whether he has stopped to think of it or not has one or more pupils in the class who are unconscious factors in the success of every recitation or school plan. "I could hardly get along without you, yesterday," said a principal to one of these hopeful pupils after a day's absence. Every good teacher, seeking for sympathetic help from every source, will understand the feeling that prompted this frank avowal that bound both teacher and pupil more closely. Teachers sometimes become possessed of the feeling that they alone are the omniscient sources of success in any line of work. The mistake is painfully apparent in the listless, inattentive class that are conscious of not being any integral part of the recitation. A true teacher finds his inspiration in the reciprocal interest of the pupils, and the better the teacher the more these helpful scholars will brighten his work.—*N. Y. School Journal.*

Can't and Try.

Can't do it sticks in the mud, but Try soon drags the wagon out of the rut. The fox said "Try!" and he got away from the hounds when they almost snapped at him. The bees said "Try!" and turned flowers into honey in abundance. The squirrel said "Try!" and he went to the top of the beech tree. The snow-bird said "Try!" and bloomed in the cold snows of winter. The sun said "Try!" and spring soon threw Jack Frost out of the saddle. The young lark said "Try!" and he found to his surprise that his new wings took him over hedges and ditches and up where his father was singing. The ox said "Try!" and ploughed the field from end to end. No hill too steep for Try to climb, no clay too stiff for Try to plough, no field too wet for Try to drain, no hole too big for try To mend—in short, no task too great for Try to do, and no trial too great for Try to meet and overcome. Let no one say therefore "I can't." Here are some lines to impress this lesson better on the minds of our youthful readers:

MR. "I CAN'T."

There's a surly old tramp who's prowling about,
He is seen ev'rywhere, so you'd better look out!
His face is all wrinkles from forehead to chin,
His lips stick right out, and his eyes go right in.

He hates all the children, and chuckles with joy
To hear people say, "There's a bad girl or boy!"
And if he can make you a drone or a dunce,
He'll sneak in and claim your acquaintance at once.

He steals in the school-room and stands at your back,
Too glad if the teacher should give you a "whack;"
And when the hard words you will spell, he will try
To make you forget, or to snivel and cry.

When doing examples that puzzles the brain,
He'll jog you and whisper, "There, don't try again!
Just mix it all up, and then rub it all out,
And don't say a word, but sulky and pout."

Beneath the piano he'll hide out of sight;
To tease you when there is his greatest delight;
He'll catch hold your fingers and blindfold your eyes,
And turn all the notes into great dragon flies.

Beware of this tramp who creeps in like a mouse,
And stealthily wander all over the house;
He's lazy and shiftless, unlike the wise ant,
His name you must know it; it is Mr. "I Can't."

How to Make a Putty Map.

Get a board the size you want your map. Do not have it in two pieces, or it will be sure to separate and leave an opening. Sketch your map on this board with a lead pencil. Get the putty at a druggist's and mould it into a pliable condition with oil. They will advise you about this. Then cover your

board with the putty, following carefully the coast outlines. Slope the putty toward the coast, as land would naturally slope. The mountain ranges can be "picked up" to resemble mountain peaks much better than to plaster on additional putty for the mountains. Of course you followed the natural elevations and depressions (by copying from a relief map) when you first laid the putty on the board. The rivers can be indicated by course, blue silk pressed into the putty while it is moist, or by using a blue pencil. Care should be taken not to have too many branches of the rivers. The cities can be indicated by a blue pencil. But only the prominent cities, lakes, and rivers should be outlined or the map will look "mixed up."—*N. Y. School Journal.*

A Little Girl's Compliment.

The accuracy with which children judge character is well illustrated in the following anecdote:—

One wet, foggy, muddy day, a little girl was standing on one side of the street, in London, waiting for an opportunity to cross over. Those who have seen London streets on such a day, with their wet and mud, and have watched the rush of cabs, hansoms, omnibuses, and carriages, will not wonder that a little girl should be afraid to try to make her way through such a Babel as that. So she walked up and down, and looked into the faces of those who passed by. Some looked careless, some harsh, some were in haste; and she did not find the one she sought until at length an aged man, rather tall and spare, and of grave yet kindly aspect, came walking down the street. Looking in his face, she seemed to see in him the one for whom she had been waiting, and she went up to him and whispered timidly, "Please, sir, will you help me over?"

The old man saw the little girl safely across the street; and when he afterwards told the story he said: "That little girl's trust is one of the greatest compliments I ever had in my life."

That man was the great and good Lord Shaftesbury. He received honors at the hands of a mighty nation; he was complimented with the freedom of the greatest city on the globe; he received the honors conferred by royalty; but the greatest compliment he ever had in his life was when that little unknown girl singled him out in the jostling crowd of a London street, and dared to trust him, stranger though he was, to protect and assist her.

THERE is a perennial nobleness and even sacredness in work. Were he never so benighted, forgetful of his high calling, there is always hope for a man that actually and earnestly works; in idleness alone is perpetual despair.—*Carlyle.*

TOPICS FOR THE SCHOOL ROOM.

The railroad train makes an average of fifteen miles an hour in crossing the 900 miles of desert from the Caspian to Samarkand. The roughness of the road and the character of the country makes a faster speed impossible. For hundreds of miles the road runs through nothing but scanty wastes, and after every storm it has to be cleared of sand. The steamers on the Caspian and the locomotives of the Trans-Caspian Railroad are run by petroleum as fuel.

It is said that the only words in the English language that end in "ceed," are "exceed," "proceed" and "succeed;" that only four English words end in "cion:" "coercion," "suspicion," "internecion" and "epinicion;" that only four end in "dous;" "hazardous," "jeopardous," "stupendous," and "tremendous."

A traveler among the Hudson Bay Indians says that no tent was carried, even in the coldest weather, and it was often forty degrees below zero, with snow five feet deep. A hole was dug down in the snow with a snow-shoe, which makes an excellent snow-shovel. Some poles were then slanted over the hole, thrust into the snow on the side; against the poles boughs were piled, and the loose snow was heaped over these. A warm hut was thus made, at the bottom of which the fire was started. The dogs were put back of them in this hut, and thus helped to keep them warm. The Indians of that country live through the winter in bark tepees, with little clothing beyond a blanket, breech clout, and leggings. Indian children are often seen playing in the snow bare-footed and bare-legged.

The purpose of the kinetograph, the latest invention of Edison, is to produce a perfect image of men, animals and other objects as they appear when in motion. It performs the same service in recording and then reproducing motion as the phonograph performs in recording and reproducing sound. To set down and record exact images of men walking, trees waving in the wind, birds flying, machinery in operation it must make photographs—a number of photographs, which, seen in rapid succession, give a clear image of moving man or brute, bird, or machine. By a phonographic cylinder attached to a kinetograph cylinder, and moving with it, we may revive and enjoy the sound, the sight, and the movement of an object.

The death of James Russell Lowell removes one of the greatest literary men of the nineteenth century. He was born at Cambridge in 1819 and died August, 1891. Among his most celebrated works are "The Vision of Sir Launfal," "The Commemoration Ode," "The Biglow Papers," and others. He was the first editor of the *Atlantic Monthly*.

Although we do not know for certain what is going on in the earth under us, we know that the heat is extreme. In the lower levels of the Comstock mines men found scalding water and a temperature of 120 degrees. The Sutro tunnel was constructed to draw off some of this heat. Borings like the one (4,172 feet deep) at Spenberg, Germany, and the one over 3,000 feet deep at St. Louis, tell us something about the interior of the earth, but volcanoes tell us more. The great heat turns the water to superheated steam, this melts the rocks, and the molten mass is forced by the pressure up through the fissures of the rocks.

SCHOOL AND COLLEGE.

The Trustees of Woodstock, N. B., have added another department to the grammar school and placed it in charge of Mr. H. D. Creed of Fredericton. The Woodstock Grammar School, under the charge of Principal Steeves, is increasing in efficiency every year.

D. M. Soloan, B. A., (Dal.), late of the Pictou Academy, and his sister, Lena Soloan, late of the Windsor public schools, have gone to St. John's, Newfoundland, to take charge of the Protestant Academy. They report the country as charming; but the thermometer occasionally too high for perfect comfort, the mercury having twice risen above 80°.

A. O. Macrae, B. A., (Dal.), of St. John, has been appointed to the vacancy in the staff of the Pictou Academy.

Victor Frazee, B. A. (Dal.), late of the Pictou Academy, has received an appointment to the staff of the Halifax Business College, under the principalship of J. C. P. Frazee.

Principal Thompson, Albion street school, Halifax, has been appointed to the staff of the Halifax Business College under the principalship of S. E. Whiston.

Professor Russell of Worcester, Mass., has arrived in Halifax, and is setting the manual department of the County Academy in order for the opening of the institution on the 7th September.

The teacher of the Halifax Kindergarten Normal Training School has also arrived, and the department is to be opened in the Alexandra School buildings.

The University of Dalhousie has opened. Matriculation examinations are going on at present.

The Halifax Ladies' College has been renovated during the summer under the direction of R. Fleming, C. E., of Montreal at an expense of several thousand dollars. This fine institution is now perfect in the convenience, healthfulness and beauty of its accommodations.

In referring to the change of teachers at the Harvey, N. B., Superior School in the August REVIEW, we should have said that Mr. W. G. Chamberlain, recently of Collina, Kings Co., took charge at the beginning of the term, and Miss Helen Hetherington is teacher of the primary department.

QUESTION DEPARTMENT.

JOE.—Will you kindly solve the following question in the next issue of the REVIEW: "A bushel measure is 18½ inches in diameter and eight inches in height, what would be the diameter of a similar measure that would contain four quarts?"

For instance: All cubes are *similar*, that is, they have exactly the same shape. A cube one foot every way contains one cubic foot. A cube two feet every

way contains *eight* cubic feet. A cubic *three* feet every way contains *twenty-seven* cubic feet. From this you can induce the law that the solid contents of (similar) cubes vary as the cubes of their ages or diameters. In solid geometry it is proven that the same property holds for all similar figures. If one sphere has *twice* the diameter of another, it has *eight* times the volume. ($2^3=8$). If it has *ten* times the diameter, it has 1,000 times the volume ($10^3=1,000$). Four quarts are equal to one gallon. One bushel=8 gallons. There the *volume* of the one measure is eight times the volume of the other; and it follows, that the diameter of the one will be exactly twice the diameter of the other. The diameter of the smaller measure is therefore $9\frac{1}{2}$ inches.

This general theorem will be useful. "The areas of all surfaces of the same shape are proportional to the squares of any corresponding lines in them; and *vice versa*, these lines are proportional to the square roots of the areas." For all solids of the same shape, change *area* in the above to *volume* and *square* to *cube* and you have the rule.

TEACHER.—Please solve the following in next REVIEW (Loomis Trigonometry, page 122) viz: The base of a triangle is 40 feet and its altitude 18 feet. It is required to draw a line parallel to the base so as to cut off a trapezoid containing 80 square feet. What is the length of the line of section and its distance from the base of triangle. 2. Wormell Geometry, page 223-1: Taking the radius of a circle as unity, find the length of the side of an inscribed equilateral triangle.

ANS. 1.—Area triangle=180 sq. ft. When trapezoid of 80 sq. ft. is cut off by a line parallel to the base, there is left a similar triangle of 100 sq. ft. But similar areas are proportional to squares of similar lines — their altitudes, for example:

$$\begin{aligned} \therefore 180 : 100 :: 18^2 : x^2 \\ 180 : 100 :: 324 : x^2 \\ 180x^2 = 34200 \therefore x^2 = 180 \\ \therefore x = \sqrt{180} = 6\sqrt{5} \end{aligned}$$

$\therefore (18 - 6\sqrt{5}) =$ distance between the two lines, = $6(3 - \sqrt{5})$.

To find length of line,

$$\begin{aligned} 180 : 100 :: 20^2 \text{ to } x^2 \therefore 180x^2 = 40000 \\ \therefore x^2 = \frac{40000}{180} = \frac{20000}{9} = 400 \times 5 \therefore x = \frac{20\sqrt{5}}{3} \\ \text{=length of line.} \end{aligned}$$

2. Draw the circle with inscribed equilateral triangle. Join the angular points with the centre. These three radii are given equal to 1, find the side of the triangle.

As there are 360° in a circle each side of the triangle subtends an angle of 120° . Bisect of these angles by a line which will also bisect a side of the

given triangle perpendicularly. The triangle thus formed has angles, therefore, respectively, 90° , 60° and 30° . The sides subtending these angles are, therefore, (by an elementary geometrical demonstration) in the ratio of $1 : \sqrt{3} : \frac{1}{2}$. As the side opposite 90° is given equal to 1, \therefore side opposite $60^\circ = \frac{\sqrt{3}}{2}$ = half side \therefore whole side of inscribed triangle = $\frac{\sqrt{3}}{2} \times 2 = \sqrt{3}$.

Colenzo at page 48 of Part II. of his Algebra gives:

$$\begin{aligned} x^3 &= 31x^2 - 4y^2 \\ y^3 &= 31y^2 - 4x^2 \end{aligned}$$

Putting $u+v=x$ and $u-v=y$ in the equation, subtracting, and adding remainder, gives $v^2 = 70u - 3u^2$. From this u and v are found = 10 and 20 respectively. Substituting these values for x and y fails to fulfil conditions of equation. Please explain why?—SUB.

ANS.—Cannot find your problem in given page in our edition of Colenzo (Longmans, London, 1870.) U and v cannot be found from the one equation $v^2 = 70v - 3v^2$, as one equation with two unknown quantities is *indeterminate*. 10 and 20 will satisfy this equation, and so will an infinite set of other numbers. For instance, if v be assumed = 1, then $u =$ two numbers. If $v=2$, then u has two other values, and so on.

BOOK REVIEWS.

DAS HAIDENDORF, von Adalbert Stifter, edited for the use of schools by Otto Heller, Philadelphia. Price 20 cents. Publishers, D. C. Heath & Co., Boston, Mass.

SHAKESPEARE'S AS YOU LIKE IT, with Introduction and Notes by K. Deighton. London: MacMillan & Co. and New York. Price 1s. 9d. The numbers of this convenient scholar's edition of Shakespeare are being rapidly brought out by MacMillan & Co. In "As you Like It" there is the same finished style, both of editor and printer, which is observable in the previous numbers.

THE CHILDREN'S PRIMER, by Miss Ellen M. Cyr, author of the "Interstate Primer," etc.; $7\frac{1}{2}$ inches by $5\frac{1}{2}$ inches; cloth, pp. 24. Ginn & Co., Boston, Mass., U. S. A., 1891. An admirable selection of words, sentences and illustrations for the first exercises in reading. Typog_ography, beautiful.

EDMUND BURKE.—Speeches on the American war, and letter to the sheriffs of Bristol, with introduction and notes by A. G. George, A. M. Pp. 19 by 242; $7\frac{1}{2}$ by 5 inches; paper board; \$0.50. Boston, U. S. A.: D. C. Heath & Co., 1891. This volume is one which will interest any intelligent citizen, and particularly Americans. Burke was a great American statesman and orator who was never an American, just as many Americans are real Englishmen although never English-

men. The cheapness of the volume and its numbered lines adapt it admirably for a high school text.

SELECTIONS FOR GERMAN COMPOSITION, with notes and vocabulary by Charles Harris, Professor of the German Language and Literature, Oberlin College. Pp. vi. and 143; 7 by 5 inches; cloth board. Boston, U. S. A.: D. C. Heath & Co., 1890. This book in part I. gives German originals with English paraphrase, as models. Part II: Easy narrative in English. III: Letters in English. IV.: Biographical, etc., in English, and has a vocabulary for all in 37 pages. All through there are numerous aids given in notes, etc.

THE COMPLETE MUSIC READER, for high and normal schools, academies and seminaries by Charles E. Whiting, formerly teacher of music in the Boston public schools. Pp. 224, 7 by 10 inches; paper board, \$0.90. Boston, U. S. A.: D. C. Heath & Co., 1891. This is a fine specimen of the art typographic. And as a complete system of the staff notation, theory, exercises and appropriate selections, we have not seen better.

A HIGHER ALGEBRA, by G. A. Wentworth, Professor of Mathematics in Phillips Exeter Academy. Pp. vi. and 521; 5 by 7½ inches; cloth board, letter back; \$1.55. Boston, U. S. A.: Ginn & Co., 1891. Typographically considered we have seen no algebra better. As regards treatment and graduation of exercises it is clear, simple, and well arranged. The range of subjects — including, in addition to elementary text books, indeterminate, co-efficients, common logarithms annuities, choice, chance, variables and limits, series, determinants and complex numbers, (all treated in a very gentle fashion) — is well adapted to our high schools.

Current Periodicals.

The *Century* for September has a varied table of contents. It has a fine portrait of Thomas Bailey Aldrich. "A winter Journey Through Siberia," by Geo. Kennan, is an interesting article, and there are some powerfully written stories, such as "Elder Marston's Revival" and "Uncle Zeki'l."... The *New England Magazine* for September contains two articles of special interest to Canadian readers — "The Brass Cannon of Campobello" by Kate Gannett Wells, and "The French Canadian Peasantry" by Prosper Bender. The excellent illustrations in the first article and the sympathetic interest which the author has in Admiral Owen and other characters in the early history of Campobello make it well worthy of preservation by New Brunswick readers especially.... *Garden and Forest*, for September 2nd contains a charming little picture, "Only a Fence Corner," and an equally charming description accompanying it, the subject being a neglected fence corner that has escaped the mower.... *Littell's Living Age* for August 29th and September 5th contains among other articles: Robert Browning, and The Last English House of the Bearded Tit, *Contemporary*; To-day in Morocco and The Diet of Great Men, *National*; Stray Thoughts in South Africa, *Fortnightly*; The "Field Naturalist:" the Rev. J. G. Wood, and Jenny Lind, *London Quarterly*; A Forgotten Race, and the Post-office in China, *Cornhill*; Statesmen of Austria, *Leisure Hour*; "A Study in Grey" and "The Prince of Morocco" and poetry. For fifty-two numbers of sixty-four large pages each (or more than 3,300 pages a year) the subscription price (\$8) is low; while for 10.50 the publishers offer to send any one of the American \$4.00 monthlies or weeklies with *The Living Age* for

a year, both, postpaid. Littell & Co., Boston, are the publishers.... *Popular Science Monthly* for September has an article by Prof. John Fiske on "The Doctrine of Evolution," which gives a clear statement of this great question. A sketch is given with portrait of Dr. Geo. L. Goodale, the distinguished botanist.... The idea of University Extension and its first expression at Oxford as far back as 1845. Since then its advance has been constant and of late years very rapid. Though Oxford was the first University to give a form to the widespread desire for higher education, it was almost the last to enter upon the practical details of the work. That it now has by far the larger number of extension students is due in great measure to the energy and skill of Michael E. Sadler, Secretary to the Oxford Delegacy, who, in the current number of *University Extension* discusses the future of this movement in England. Other articles show the relation of this work to the common school teacher and to American women. One of the most successful experiments of last season in Extension Teaching was at Providence in connection with Brown University and is described in this August issue by Prof. Appleton, of that faculty. In the department of *Notes* is an interesting hint as to the natural connection of this movement with the Chautauquan system, so excellently developed by Bishop Vincent and his assistants.... *Studies from the Kindergarten* by the students in the New York College for the training of teachers, 9 University Place, New York. This is a series of articles on kindergarten training which cannot but prove useful to teachers of primary departments.

New Brunswick Normal School.

The following are the questions set for the entrance examination at the N. B. Normal School, during the first week in September:

MENTAL ARITHMETIC.

Time, 10 minutes.

(Write answers on this paper. Work to be done in absolute silence. Pencils or pens not to be used, except to set down results.)

1. \$52.50, less ten per cent. of itself?.....Ans
2. 19½ yards at 18 cents a yard?.....Ans
3. Area of a floor, 18 feet long by 3¼ yards wide?.....Ans
4. Reduce 6½ cwt. to the decimal of 3½ ton?.....Ans
5. Bought a horse and carriage for \$270. The horse cost twice as much as the carriage. Sold the horse for 12½ per cent. more, and the carriage for 20 per cent. less than cost. Did I gain or lose, and how much?.....Ans
6. Interest of \$25.20 for 16 years, 8 months, at 6 per cent.....Ans
7. What number is that from which if ¾ of ¾ of itself be subtracted, the remainder will be 49?.....Ans
8. How many revolutions does the second hand of a watch make in a day?.....Ans
9. Find the difference between .1 and .01.....Ans
10. If the first day of May falls on Monday what day of the week will the first day of July be?.....Ans

LANGUAGE.

Time, 1 hour 45 min.

1. Write, with close attention to arrangement of words and sentences, spelling, punctuation, and proper use of capitals:

(a) A brief narrative (as if for publication in a newspaper) of some interesting incident or event which has recently occurred in your native place.

(b) A brief description of some striking feature of the scenery in the neighborhood of your home.

(c) A letter to your teacher giving your first impressions of the Normal School and of the entrance examination.

2. What newspapers, magazines or other publications have you been in the habit of reading? What books other than school text books have you read or studied during the year, and with what benefit to yourself?

3. Name the authors of the following extracts in Readers No. 4 and 5: The Prairie on Fire, Archery in the Olden Time, The Death of Little Nell, Lady Clare, The Relief of Londonderry, The Wreck of the Hesperus, Mercy, Iceland and the Geysers, The Battle of the Baltic, The Death of De Boune. Give, where possible, the name of the larger work from which the extract named is taken; the work by which the author mentioned is best known; the dates between which each author lived.

(Answer to this question in tabular form preferred.)

4. Write the corrected form of the following sentences: If he was there I never seen him. Whoever it is, it will not be him. He wired me from Moncton. He done the work splendidly. The scenery along the St. John is very graceful. The average ages of the children in grade VIII, are about 13. I should have preferred to have seen it for myself. It will never do to bulldoze parents or pupils. The street lays north and south. I don't see as I can be of much use.

5. (a) *That loss is common does not make
My own less bitter, rather more;
Too common! Never morning wore
To evening, but some heart did break.*

(b) *Naught was heard in the room save the hurrying pen
of the stripling
Writing epistles important to go next day by the "May-
flower."*

(1) Write any easy paraphrase of quotation (a).

(2) Give the full grammatical analysis of either (a) or (b).

(3) Parse the words in italics in the quotation selected by you.

6. Choose one of the following topics and show fully, by examples, your acquaintance with:

(a) Different ways of expressing gender in nouns.

(b) Irregular comparison of adjectives.

(c) Table of Personal and Simple Relative Pronouns.

(d) Conjugation of an irregular transitive verb in all the moods and tenses of the active voice.

N. B.—Question 2 is optional.

USEFUL KNOWLEDGE. Time, 1 hour.

(Five Questions make a full paper.)

1. What part of the flower forms the essential part of the fruit? What other part of the flower is often, and what parts are rarely or never present in the fruit?

2. Show whether the tubers of the potato are seeds, and if not, what they are. Explain the nature of the so-called eyes of the potato.

3. Mention some plants from which starch is obtained in large quantities. How do you account for the storing up of the starch by the plants?

4. Mention some plants of the pine, grass and lily families respectively, which grow wild, or are cultivated in New Brunswick, and state briefly their uses. Describe one of the plants you mention.

5. Name three kinds of rocks which are largely employed in the construction of buildings, and give localities in New Brunswick where they are quarried. Tell what you can of the composition of these rocks.

6. Mention several of the qualities by which minerals are distinguished from each other, and contrast any two minerals known to you in respect to these qualities.

7. Give arguments to show that no one in health is benefited in mind or body by the use of alcoholic beverages.

8. What poisonous gas is apt to accumulate in sleeping apartments? Give its composition and tell how it is produced. How may its ill-effects be avoided?

HISTORY.

Time, 1 hour 45 min.

A.

1. Write a short paragraph on each of the following topics, giving names, dates and places, to show your acquaintance with each, viz.:

(a) The discoveries of the French and English in America.

(b) The struggle between France and England for the possession of the New World.

(c) The final settlement of the struggle.

(d) The Quebec Act.

(e) The American Revolution.

(f) Responsible Government in Canada.

(g) The Confederation of the Provinces.

2. Give, in tabular form, a list of the Provinces of the Dominion, with the date of their admission into the confederation, and the constitution of the legislature of each.

3. *Current Topics.* (a) What eminent Canadian statesman died during the present year? Give a brief sketch of his life. (b) What was the question at issue in the last Dominion election? (c) What change has recently been made in the Canadian Tariff, and what was its effect? (d) What action was taken at the last session of the New Brunswick legislature with respect to the legislative council? (e) What is the difference between a general and by-election? In what county of New Brunswick is a by-election now pending?

B.

4. Show your acquaintance with three of the following topics, selecting one from each of the group lettered a, b and c:

(a)

Roman Rule in Britain.

The Anglo-Saxon Conquest of Britain.

The Danish Inroads.

The Saxon Heptarchy.

England Under Saxon Rule.

(b)

The coming of the Normans.

The Plantagenet line of Sovereigns.

Magna Charta.

The wars with Scotland.

The wars of the Roses.

(c)

The Stuarts and the Puritans.
The Elizabethan Age.
The Revolution.
England under the four Georges.
The Reign of Victoria.

5. Name three persons of each of the following classes, tell in what reign they lived, and what has made them famous: British statesmen, poets, artists, scientists, generals or admirals, inventors, novelists.

6. In what way are the following persons connected with Canadian or American History, viz.: Henry VII., Charles I., Oliver Crowell, Sir Walter Raleigh, William Pitt, Earl Dufferin, the Marquis of Lorne?

N. B.—In A, 2 and 3 are alternates; in B, 5 and 6.

ARITHMETIC.

Time, 1 hour 30 min.

(Give all the work that you find it necessary to set down.

Work the first four and any three other questions.)

1. Find the difference in pence between $\frac{3}{4}$ of $\frac{2}{3}$ of 6 shillings, and .0875 of 2-5 of £1.

2. What would it cost to dig a ditch 40 rods long, 3 feet wide, and $4\frac{1}{2}$ feet deep, at 18 cents per cubic yard?

3. Subtract $7\frac{1}{2}$ bushels + $\frac{2}{3}$ of 56-75 of $3\frac{1}{2}$ quarts from $5\frac{8}{9}$ bushels + 3 31-45 quarts.

4. On the 6th of July, John Thompson bought of Thomas Johnson the following articles: 2 barrels of flour, at \$5 75; 35 lbs. of sugar, \$2; 1 caddy of tea (10 lbs.) at 35 cts.; 25 lbs. of oatmeal, at $3\frac{1}{2}$ cts.; $9\frac{1}{2}$ lbs. of beef, at 9 cts. He paid \$5 on account. Make out the bill as receipted when paid, August 29th.

5. The number of candidates undergoing this examination being —, suppose about 17 per cent of them make averages from 40 to 50; 40 per cent. from 50 to 65; 23 per cent. from 65 to 75; and 11 per cent. make 75 and upwards. Find the nearest whole numbers to give these percentages *i. e.*, the number of candidates in each case.

6 (a) In a common year, find the exact average number of days in a month. (b) The average of 16 persons in 29 years; the average of the first is 15 years; and that of the next 6 is $44\frac{1}{2}$ years. How old is the last of the 16.

7. A and B join in business. A puts in \$700 for 12 months, and B \$500 for 18 months. Divide a profit 1,305 equitably between them.

8. How much money must be paid at interest at 6 per cent to yield an annual income of \$500?

9. Find the sum of .01875 and $3\frac{1}{16}$ by two methods, one of which will give the result as a decimal, the other as a common fraction. Show that the two results are equal.

10. A merchant bought 40 bbls. of apples at 3.20 per bbl. If each barrel contains on an average 400 apples, and two out of every twenty decay, at what rate per dozen must he sell the remainder in order to gain 25 per cent. on his outlay?

DRAWING.

Time, 1 hour.

(Drawings should be at least 3 inches wide, and must be done freehand.)

1. Draw a circle, and within it draw a narrow and a broad eclipse, having their long diameters equal to that of the circle, and at right angles to one another.

2. Make a perspective drawing of the object on the table, or, draw a border suitable for a mat.

3. Make a drawing of the leaf or flower of any native plant. Print neatly the name of the plant below the drawing.

GEOGRAPHY.

Time, 1 hour 45 min.

1. Draw an outline map of New Brunswick not less than six inches square. On it indicate by suitable lines and names the following, viz:

(a) *Coast Waters and Islands*.—Bay of Chaleur, Nepisiguit bay, Miramichi bay, Buctouche and Shediac harbors, Bay Verte, Shepody bay, Cumberland basin, St. John harbor, Mace's bay, Passamaquoddy bay; Miscou, Shippegan, Portage, Grand Manan, Campobello and Deer Islands.

(b) *Rivers*.—Saint John, Miramichi and Restigouche, with their chief tributaries, Richibucto, Petitcodiac, Magaguadavic, Saint Croix.

(c) *Lakes*.—Grand, Oromocto, Magaguadavic, George, Long, Lomond, Utopia, Chiputneticook.

(d) *Cities and Towns*.—Campbellton, Dalhousie, Bathurst, Newcastle, Chatham, Buctouche, Sackville, Moncton, Dorchester, Hopewell, Harvey, St. John, Sussex, Hampton, Gagetown, Oromocto, Fredericton, Woodstock, Centreville, Andover, Grand Falls, Edmundston, Milltown, St. Stephen and St. Andrews.

(e) *Counties*.

(f) *Railways*.—Intercolonial—Canadian Pacific, with its branches—Canada Eastern—Caraquet—Kent Northern—Grand Southern—Central—St. Martins and Upham—Elgin, Petitcodiac and Havelock—Tobique Valley—Albert (or Harvey and Salisbury)—New Brunswick and P. E. I. Railway.

(g) As nearly as you can the parallels and meridians, numbering them at sides, top and bottom of map.

2. On another outline map of New Brunswick (rapidly drawn and of any convenient size) indicate the locality of (a) the chief economic minerals, (b) the forest areas, and (c) the important industries.

3. Give the names of the Parishes in one County.

4. What advantages does New Brunswick possess which are likely to make her (a) a productive farming country, (b) a manufacturing country, and (c) a commercial country.

5. Describe quite fully (giving waters passed through, countries, varieties of climate, and any interesting facts you may know) the route of a passenger round the world, leaving London by the C. P. R. steamer *Empress of India*, touching at Gibraltar, Malta, Port Said, Colombo, Singapore, Hong Kong, Yokohama, and Vancouver, thence to Montreal and Liverpool.

6. Contrast (briefly and generally) North America and Europe with respect to—area, form, direction of greatest length, distribution of mountains, direction of watersheds and slopes, size and number of political divisions, length and volume of rivers, climate.

Answer the first three and any two others. The value of question 1 is 50 per cent.

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FACULTY OF ARTS—(Opening September 14th, 1891.)

DONALDA SPECIAL COURSE FOR WOMEN—(September 14th.)

FACULTY OF APPLIED SCIENCE—Civil Engineering, Mechanical Engineering, Mining Engineering, Electrical Engineering and Practical Chemistry—(September 15).

FACULTY OF MEDICINE—(October 1st.)

FACULTY OF LAW—(September 7th.)

FACULTY OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE—(October 1st.)

MCGILL NORMAL SCHOOL—(September 1st)

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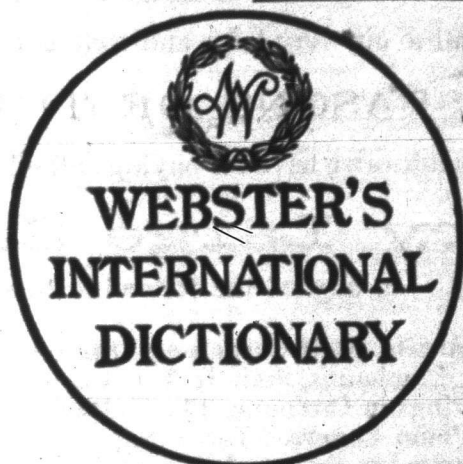
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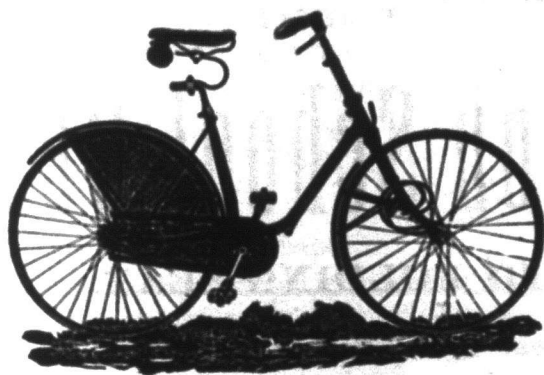
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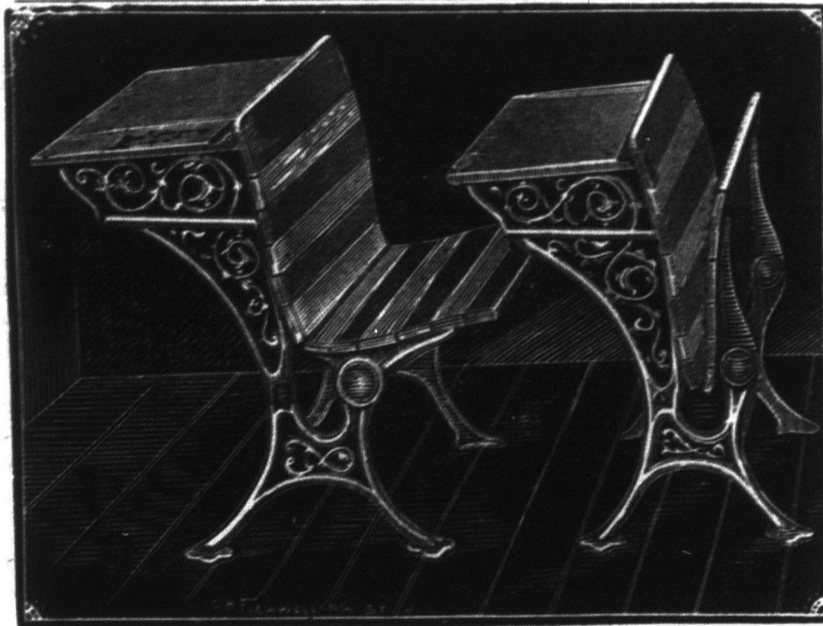
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