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THE SCHOOL MAGAZINE.

MARCH, 1880.

CANADIAN SCHOOLS FIFTY YEARS AGO.

OUR school system is one of the great and expensive institutions of our country; great results have followed its establishment, and greater still are expected to follow. To avoid in part the levied assessment attending the support of Common Schools, it would be well for Manitoba and the great Northwest, which are now being opened up, to copy the example of our neighboring States, and set apart a portion of the Government lands for the support of Common Schools.

To those who are basking in the intellectual blaze of our present schools, perhaps some account of one of our old schools may be of interest—by which they may be the better able to appreciate the many advantages that lie within their grasp.

Our schoolhouse stood in the corner of the graveyard connected with the old Methodist Chapel, on the Stoney Creek battle-ground. It was quite fresh and new when I first attended school there in 1824, the east gable bearing the date 1822 rudely cut in a stone. It was an expensive structure for its day, and reflects credit on the enterprise and the desire of those who

contributed to its erection, in order to educate, as far as lay in their power, not only the children growing up in the section, but also to assist the young men and the young women, who were already beginning to smart under the thought of being almost illiterate, to obtain, if they chose, the rudiments, at least, of an English education. The thick walls were of stone; three large square windows gave an abundance of light, one being placed in the east end, and one on each side, the west end being occupied by an enormous fireplace, the jambs of which were carried straight up to the height of a man's head, where a contraction of about two feet on each side gave the outside width of the massive chimney. In fact, the fireplace occupied more than half the width of the room, which was probably eighteen by twenty feet inside.

To supply this mammoth fireplace great quantities of wood were required; but as timber was of no value in those days, there was seldom any scarcity of fuel; the only difficulty lay in getting it cut up and in obtaining enough dry wood to make the green burn. "Drags,"

or logs as large as two yokes of oxen could haul, made up the greater part. All sending children to or attending the school freely contributed in the fuel line, either in cutting or hauling. Young men working for farmers at eight dollars a month during summer, could have "a winter's schooling" of three months for a dollar and a quarter, while they worked nights and mornings for their board. There were no andirons for this great fireplace, but instead thereof fire-proof stones of the proper shape were used to rest the wood upon. The first important point to be observed in making those huge fires was to get a large back-log of timber that would burn slowly; for when a back-log gave out during the day, a general rebuilding of the fire must take place, and all who ever assisted in the operation will remember quite easily that it was a vexatious and a very smoky job. The tears we have shed on such occasions were sufficient to express our grief for the loss of all our friends. The back-log, six or seven feet in length, being rolled into a bed of hot coals, the back-stick and the top-stick were mounted above it, in front came a big fore-stick, next the brands and the chinking were systematically put into shape, and the great fire, crashing and crackling, soon sucked a small hurricane up the chimney, and the room being freed from smoke, the door and windows would be closed and all leave off weeping and settle into composure, and the "master," too, suddenly became a nice man again, and stamping the ashes off his boots, and brushing his clothes with his hands and wiping the perspiration from his forehead, would sweetly say, with a sigh, "bring in some wood to dry."

To be capable of building and keeping up a good fire was an important qualification for a teacher. If the word was passed around that a "master didn't know anything about building

fires and keeping the children warm," his chances for the next winter would be doubtful—he might answer for summer teaching but not for winter. Teachers were paid six shillings and threepence to seven and sixpence, H. cy., per quarter (3 mos.) for each pupil taught, with board among the employers in proportion to the number of pupils each sent to the school; otherwise ten shillings without board, in which case an account was kept of the number of days' attendance, and the pay was doled out accordingly. One of our best teachers was employed at ten dollars a month, with board guaranteed as customary. This was an uncertain method of keeping a school open, and occasionally patriotic people would subscribe one or two pupils, who had no children to send to the school. Our school books were Webster's Spelling Book, Murray's small English Grammar, Johnson's Dictionary, to which we referred to ascertain the part of speech to which a word belonged. Our reading books were that very excellent work, Murray's English Reader, the New Testament, and an occasional stray newspaper. Walkinghame's Arithmetic, and afterwards DeBoll's, completed the list of books. Arithmetic was taught in great part without a book, or one made to answer for several pupils. Slates were scarce and without frames, and pencils hard to obtain. I was fortunate in having a small slate given me by a kind old lady who had brought it from Dutchess County, N. Y. Thus we struggled on for years—thirsting for learning without the means of acquiring it. At length, teachers from the New England States, who had been trained under the great Noah Webster's system, came in search of situations. The first employed introduced Woodbridge & Willard's Geography; they were brought in by the stage coach, and were expensive, \$1.75 per copy, but how delighted we were

with them. Geography had not been taught; a new existence was opening up to us—a wide and glorious world lay spread out before us; the neighbors talked about the book and stopped us on our way to school to look at it, all ablaze with colored maps; and the good old lady who gave me the little slate called me back one morning as I proudly passed the door to enquire if that book I carried was a “joggrify?” “Yes, marm.” “Does it say the world turns on axletrees?” “Well, yes, marm.” “It lies, it lies! Don’t you believe it!” The book was in bad repute for some time; one pious individual asserting that it was a dangerous book and contrary to the Scriptures, in which it was distinctly stated that Joshua commanded the sun and moon to stand still, and they obeyed.

The next teacher introduced Kirkham’s Grammar, and we no longer consulted a dictionary to ascertain the part of speech to which a word belonged. His method of teaching grammar was extremely happy and interesting; he held evening classes and walked the floor and lectured an hour, we would be told to open our books and compendiums. We would then parse a few sentences, giving our reasons for everything, and correct false syntax as we passed along. In this way we were kept earnestly interested in our study, and carried pleasantly through the work. He also introduced Adams’ Arithmetic, in teaching which he was equally fortunate; many in a fair way to pass through life dunces in arithmetic were rescued by the engaging method pursued by him. He taught the school several years, and on his retiring, my acquaintance with the school ceased.

The thinking tendencies of after life are very much guided by past school-day surroundings. Our school-house, as I have said, was located on a pleasant rise of ground on a former

battle field, beside a large graveyard, and near a venerable old chapel; besides this, the principal thoroughfare and stage route of the country ran within a few rods of the door. On the south the shadowy brow of the mountain rose; on the north, one of the largest and best cultivated farms, with orchard and barns, and a long, low, comfortable dwelling, with verandah, perched on a gentle hill. To the eastward lay the valley of the Stoney Creek, where the American army was routed while preparing food for the following day’s march on Burlington Heights, which never took place; beyond lay the village, which, though small, had its stagehouse, post-office, shops, stores and mills.

If the reader does not weary, I will recapitulate: the graveyard was considered sacred, and we were not allowed to run riot inside its limits; there was ample space in front for a playground. The massive old chapel inspired us with veneration and awe, and the sheen on the window panes inclined us to imagine weary spirits lingered within, who, however, became invisible when flesh and blood approached their legitimate lurking-place. On funeral occasions the school was allowed to attend, with the strict injunction not to tread upon a grave. Loyalty was securely fastened upon us by the presence of the little mounds and pits where our country’s defenders lay sleeping, who gave up their lives to secure our freedom; and every leaden bullet, and every rusty bayonet, and other fragments, were to us valuable relics of the midnight struggle. We circled round “Loreny’s oak tree,” where the first sentry was bayoneted and the first blood shed. We gazed on the valley and the hill side, and compared notes concerning the position of the invading army, and in our childish imagination could almost see their artillery in the road, and on the south of it, with the reserve in the rear

of the guns—while the principal part of the infantry lay on the sloping ground at the foot of the high rounded hill and in the meadow. We fancied we saw the lane on the north of the road and almost in front packed with men; they who fled at the approach of the British; and terrified with the formidable array, we nervously glanced westward to catch a glimpse of the steady, silent, five hundred heroes who in a moment more would charge into the midst of the enemy's camp of twenty-five hundred, seize their two generals and as many men as they could carry away, and, facing about, retire a short distance, and in triumph watch the retreat of that army so formidable a few hours before.

The result has been that from this school a joyous, patriotic, and a moral people have issued, and the influences

by which they were surrounded at school have been felt wherever their lots have been cast through life. I do not remember that one of my school-mates ever committed a serious crime, or was ever in prison. Therefore I would say, let our schoolhouses be pleasantly located—far away from low villages; make the schoolhouse and grounds as attractive as possible; let there be three or four acres of land attached to the school as a place of recreation; plant it with a variety of trees and shrubs, particularly evergreens; place a few statues of good men there; draw around the pupils such influences as will elevate their thoughts and curb their passions, and our institutions will continue in safe keeping, and our people's morality and progress be secured.

HANS.

NOTES ON EDUCATIONAL TOPICS.

IT is asserted by the Philadelphia papers, that its city teachers are grievously over-worked and under-paid. This may truthfully be said of nearly all teachers, especially those in the town and city schools. The demands made upon their mental and physical strength are beyond computation. After a weary day in the school-room, they are compelled to sit up until nearly midnight, looking over dictation exercises, essays, examination papers, and all that sort of thing, and yet, with all this monotonous work and routine, they are expected to take the liveliest sort of interest in the educational and social topics of the day. The unhealthy spirit of rivalry existing between schools is driving many teachers to undertake too much, and,

as a consequence, their mental and physical energy is, in some cases, exhausted by incessant work.

There is too much teaching done now in our schools. Teachers are expected to clear away difficulties almost as soon as they are presented to the mind of the pupil. In some schools that we have heard from, the daily work of teaching begins at eight o'clock in the morning and continues until nearly five in the evening, with an intermission of an hour in the middle of the day. At these schools Saturday is often a grand field day of *crum*. Success at examination is perhaps attained in this way, often at the cost of ill health, but education under such circumstances is almost impossible.

A leading daily paper, in commenting on this subject, says: "the evils resulting from an overdose of home work are perhaps the most serious and most subtle of all. The strain kept up on the pupil's body and mind during school hours must be followed by complete relaxation, in order that both may be reinvigorated for the duties of another day. The bow that is always kept bent will soon lose its elasticity, and the organization that is kept constantly in a state of tension will soon collapse. Hard, constant, enervating work for five or six hours is quite enough in one day for young children, and any additions made to it in the case of those that are older should be made with the utmost caution. Many a life has been blasted by the crushing of mind and body under the incubus of overwork at school. There has been in the past far too much of this in our Public Schools everywhere, and perhaps most of all in towns and cities. In rural districts the walk to and from the school is an admirable corrective, while the necessity of doing some farm or house work is equally so. But the danger to the children is very great in cities, and it behooves School Boards to be extremely careful in their dealings with the pupils respecting school hours and work."

The great object of school study is to train the pupils to self-exertion and independent effort—to give them the ability to depend upon their own efforts as students, and gradually to dispense with the aid of a teacher; it is therefore of supreme importance to avoid everything that discourages or deprives pupils of self-reliance, and nothing has a stronger tendency in this direction than the imposition of excessive tasks, and the consequent necessity for much teaching. Habits are always more valuable than facts; it is not the quantity of knowledge acquired that

constitutes a criterion of mental advancement, but the mode of employing the mental faculties—the habits of thought into which the mind has settled in making its acquisitions, or in applying them. The high value placed upon written examinations as a test of scholarship by our educational rulers has brought about this undesirable state of affairs, and, so long as educational effort centres upon this test for efficiency, and the success of a teacher's work depends upon the number of pupils he can pass through the semi-annual ordeal, will teachers and pupils be subjected to the high pressure under which a great deal of the work of our schools is now done. It is a misfortune for a student to fall into the toils of a school that is constantly trimming its sails with the view of coming in well ahead on the day of competitive examination.

It seems to be the unanimous opinion of teachers throughout the province, that there should be a rotation of examiners for all of our school examinations. Capable men can surely be found among the professors and tutors of our Universities, willing to *prepare* the examination questions; it is not necessary that they should *examine* the answers of candidates; this work is now done chiefly by sub-examiners, selected by the Minister of Education from amongst those who are not actively engaged in preparing students for the examinations. It would be well not to announce the names of the examiners beforehand, and on no account should the questions for important examinations be printed *before* they are submitted to the candidates. The examination papers for first-class teachers could easily be printed by means of the papyrograph or lithogram, during the day of examination; those for second and third-class and for entrance would still have to be printed.

The subject of free Kindergarten is now being agitated in several cities in the United States, and is acquiring greater importance with its discussion. Hitherto these institutions have only been accessible to people of means, but it is coming to be felt that they are as much a necessity for the poor. By law, children under five years cannot be admitted into the public schools. Meanwhile, they either wander in the streets, or in vicious homes, neglected and uncared for, lay the foundation of an evil youth and criminal maturity. A few hours in a Kindergarten would go far toward giving them a desire for the further instruction which they would receive when they could enter the public schools. Then there are those who, through the graded system, are thrown out of one class into a lower, which pride will keep them from entering. These become truants, and unless some means are taken to gather them up and employ their time, will grow into pests of society. The youngest of these could easily be cared for in the Kindergarten until such time as they could go back into school. The welfare of the poorer classes demands that these institutions should be incorporated into the public school system. As yet they are established by charitable individuals, but not in sufficient numbers to accomplish all that is desirable. The experience of the charity Kindergarten is, that children from the most wretched homes are the most easily attracted, and "are made enthusiastically happy by the wise and gentle Kindergarten, who begins with taking it for granted that they would like to be helpful of others' enjoyments, if they only knew how. There is also an immediate reaction of the most satisfactory character upon the poor parents, whose self-respect is often revived."

The Kindergartens which have thus far been in operation are of so ex-

pensive a character as to be beyond the reach of the great majority. The time has not yet come when the Kindergartens will be supported at public expense, but people are growing more and more interested in the subject, and the feeling is growing that something of this character is desirable.

The present scholastic year consists of ten months and is usually divided into two sessions; the first session extending to the 1st of July, when the entrance and Intermediate examinations are held; the second session beginning on the 1st of September, and extending to the 22nd of December. The first session contains six months and the second three and a half months. This is a very unsatisfactory division of the year, especially for the Public Schools. The last week in May, or the first week in June—the interval between seeding and haying—would be the most favourable time for holding terminal examinations in rural Public Schools, and it would be the best time also for holding the promotion examinations in the graded schools of villages, towns and cities; but while the examinations for admission to High School and Collegiate Institute are held in July, the present unequal division of the school year will have to remain. Under existing arrangements the amount of work that can easily be compassed during the first session cannot be done with any degree of thoroughness in the second session, and the result is, that the pupils that come up for admission to the High School in December are not so well prepared to do High School work as those that present themselves for the entrance examination in July. If it is desirable to hold two entrance examinations during the year, there should also be two Intermediates. The December Intermediate was dropped in the hope of relieving the pressure which some schools ex-

perienced in preparing for semi-annual examinations for entrance to the Upper School. Instead of lessening the pressure it has actually increased it, and the difficulty of classifying Lower School pupils, some of whom take a whole year of special training for the Intermediate, while others take

but six months, is now greatly intensified. There should be two promotion examinations a year in all grades from the lowest primary to the Intermediate class, and the best time for holding these examinations would be during the first week in June and the last teaching week in December.

MATHEMATICS.

Solutions to the Problems in the February Number.

9. Let ABCDE be the pentagon formed. We are required to prove it equilateral and equiangular. Let one end of the slip project through AB so that its edges are AD and BC, and let the other end project through DE, its edges being CD and BE, so that CD is parallel to BE and AD to BC; CA and DE are also parallel edges, and so are AB and CE. Draw DF perpendicular to AC and CG to AD, and let BE cut AC in H and AD in K; then CG is equal to DF, each being the width of the paper, and CD is common to the two triangles CFD, DGC, therefore the angle FCD is equal to GDC, and therefore AC eq. AD; also the ang. FDC eq. GCD and FDE, GCB are right ang., therefore ang. BCD eq. CDE and BCH eq. EDK. Because AC eq. AD and BE is parallel to CD therefore AH eq. AK; therefore in the triangles BHC, EKD we have the ang. at H. K eq. and those at CD, also HC eq. KD, hence the ang. HBC eq. KED and BC eq. ED and BH eq. KE; hence also the triangles ABH, AEK are eq. in all respects, therefore AB eq. AE and ang. ABC eq. AED. We have thus shown that AB eq. AE, BC eq. DE, the ang. ABC eq. AED, and BCD eq. CDE. Similarly by dropping perpendiculars from B, C on EC, EB we should obtain AE eq. ED, AB eq. CD, ang. EAB eq. EDC and ABC eq. BCD. These two results combined give CD eq. AB eq. AE eq. ED eq. BC and ang. A eq. D eq.

C eq. B eq. E. Therefore the pentagon is equilateral and equiangular.

10. For the sake of brevity let a denote the number of gallons the cistern holds, and b the number supplied to it every minute. Then

	Taps.	Gals.	Gals.	Min.	
	24	empty	a	$5\frac{1}{2}b$	in $5\frac{1}{2}$ (1)
\therefore	24	"	$26a + 143b$	"	143
Similarly	15	"	$11a + 143b$	"	143
\therefore	9	"	$15a$	"	143
	$2\frac{3}{5}$	"	a	"	33 (2)
	$15\frac{3}{5}$	"	a	"	$5\frac{1}{2}$
\therefore from (1)	$8\frac{2}{5}$	"		$5\frac{1}{2}b$	" $5\frac{1}{2}$
	$8\frac{2}{5}$	"		$33b$	" 33 (3)
\therefore from (2) and (3)	11	"	$a + 33b$	"	33

$$11. \text{ If } \frac{a^2 + b^2 - c^2 - d^2}{a - b + c - d} = \frac{a^2 - b^2 - c^2 + d^2}{a + b + c + d}$$

$$\therefore \frac{a^2 + b^2 - c^2 - d^2}{a^2 - b^2 - c^2 + d^2} = \frac{a - b + c - d}{a + b + c + d}$$

Adding and subtracting num. and den. of these fractions we obtain

$$\frac{a^2 - c^2}{b^2 - d^2} = -\frac{a + c}{b + d}$$

$$\therefore \frac{a - c}{b - d} = -1 \quad \therefore 1 = \frac{a + b}{c + d}$$

Multiplying both sides of this last equality by

$$\frac{c - d}{a - b} \text{ gives } \frac{c - d}{a - b} = \frac{ac - ad + bc - bd}{ac + ad - bc - bd}$$

Adding and subtracting num. and den. gives

$$\frac{a-b-c+d}{a-b+c-d} = \frac{ad-bc}{ac-ba}$$

$$\therefore \frac{ac-bd}{a-b+c-d} = \frac{ad-bc}{a-b-c+d}$$

12. The interest on a sum of money for one year at 5 per cent. per annum is $\frac{1}{20}$ of the sum. Hence we require to find the time for which the discount is $\frac{1}{20}$ of the sum. Now, when the discount is $\frac{1}{20}$, the interest is $\frac{1}{18}$. If, therefore, the interest becomes $\frac{1}{20}$ in one year it will become $\frac{1}{18}$ in $1 \frac{1}{9}$ yr. Ans

13. Let a denote the remainder in each case, then the full quotients are, respectively :

$$1.11 + \frac{a}{9.009} \text{ and } 9.009 + \frac{a}{1.11}$$

and since $\frac{a}{9.009}$ is less than $\frac{a}{1.11}$ it follows that 1.11 is more nearly correct than 9.009.

14. Pressure = WAL where W is the weight of a cubic unit of the fluid (=62½ lbs), A the area of the surface against which the fluid presses (=484 × 9 sq. ft.) and L the average depth (=16½ ft.) Hence the pressure is 62½ × 484 × 9 × 16½ lbs.

15. Multiply up and the equations become

$$x^{x+y+1} = y^{x+y+4}, x^{x+y-1} = y^{4-x-y}$$

$$\therefore x = \frac{y^{x+y+4}}{y^{x+y-1}}, x = \frac{y^{4-x-y}}{y^{x+y-1}}$$

$$\therefore \frac{x+y+4}{x+y-1} = \frac{4-x-y}{x+y-1}$$

whence $x+y = 2$ or -2 (2)

\therefore (1) becomes $x^3 = y^6 \therefore x = y^2$

\therefore from (2) we have $y = 1, -2, \&c.$

16. Were it not for emigration the population at the end of each year would be 1.05 as great as at the beginning of that year ; but since ½ per cent. is annually carried off the population at the end of each year will be only .995 of 1.05 as great as at the beginning. Therefore in five years the pop. becomes (.995 × 1.05)⁵ as great as at first ; therefore the increase per cent. in five years is (1.05 × .995)⁵ - 1.

PROBLEMS.

17. (a) Every common multiple of a and b is a multiple of their least common multiple.

(b) Every common measure of a and b is a measure of their greatest common measure.

(c) The greatest common measure of a and b is the least common multiple of all their common measures.

(d) The least common multiple of a and b is the greatest common measure of all their common multiples.

18. If the G. C. M. of a and b contain n simple factors, then the whole numbers of common factors of a and b (leaving out unity) is $2^n - 1$.

19. If x is real the value of the expression

$$\frac{ax^2 + bx + c}{1 + x^2} \text{ must lie between}$$

$$\frac{a+c+\sqrt{[b^2+(a-c)^2]}}{2}, \text{ and } \frac{a+c-\sqrt{[b^2+(a-c)^2]}}{2}$$

20. If x, y, z be real numbers, prove that $a^2 x - y)(x - z) + b^2(y - z)(y - x) + c^2(z - x)(z - y)$ will always be positive, provided that any two of the quantities a, b, c are together greater than the third.

21. Prove that

$$1 + 3n + \frac{3 \cdot 4}{1 \cdot 2} \frac{n(n-1)}{1 \cdot 2} + \frac{4 \cdot 5}{1 \cdot 2} \frac{n(n-1)(n-2)}{1 \cdot 2 \cdot 3} + \&c.$$

$$= 2^{n-3}(n^2 + 7n + 8)$$

22. The united salaries of two persons amounts to 4 400 dollars. The one spends two-thirds of his salary and the other three-fourths. They save between them 1,310 dollars ; find the salary of each. (By arithmetic.)

23. What is the price of eggs per dozen when two less in the shilling's worth raises the price one penny per dozen ? (By arith.)

24. The distance between the earth and moon being expressed by 59 9643 with reference to the earth's radius as unit, and this radius being 3962.8 miles, each of these numbers being exact to the nearest decimal, what can be known of the moon's distance from the earth in miles ?

25. Two travellers, A and B, set out from two places, P and Q at the same time ; A

starts from P with the design to pass through Q, and B starts from Q and travels in the same direction as A. When A overtook B it was found that they had together travelled 30 miles, that A has passed thro' Q four hours before, and that B, at his rate of travelling, was nine hours journey distant from P. Find the distance between P and Q. (By arithmetic.)

Pass paper, Junior Matriculation, Toronto University, June, 1879.

1. Define the greatest common measure and least common multiple of any number of quantities. How is the L. C. M. of a number of fractions found?

Add together $\frac{13}{42}, \frac{59}{63}, \frac{83}{121}, \frac{3}{70}, \frac{91}{110}, \frac{91}{264}$.

2. Prove the rule for the conversion of a circulating decimal into a vulgar fraction, using a numerical example.

3. Distinguish between interest and discount and show that if P, I, D, be respectively the principal sum, and the interest and discount upon it for any given time.

$$\frac{I}{D} = \frac{I}{I} + \frac{I}{P}$$

4. A person has an income derived from £3,360 which was originally invested in the four per cents. at 96; if he now sells out at 94 and invests one-half of the proceeds in railway stock at 82½ which pays a dividend of 3 per cent., and the other half in bank stock at 164½, paying 8½ per cent. dividend, what difference will he find in his income?

5. Simplify (i) $\frac{2^{n+4} - 2 \times 2^n}{2^{n+2} \times 4}$

(ii) $\frac{x^2 + \left(\frac{a}{b} + \frac{b}{a}\right)xy + y^2}{x^2 + \left(\frac{a}{b} - \frac{b}{a}\right)xy - y^2}$

(iii) $\frac{a^2 + b^2}{b} - a \quad a^2 - b^2$
 $\frac{\frac{I}{b}}{\frac{I}{a}} \times \frac{a^3 + b^3}{a^3 + b^3} \times$

$$\left(\frac{a+b}{a-b} + \frac{a-b}{a+b}\right) \left(\frac{a}{a+b} + \frac{b}{a-b}\right)$$

6. Divide $6x^5 - 4x^4 - 19x^3 + 23x^2 - 13x + 3$ by $3x^2 - 2x + 1$ (i) in full; (ii) by Horner's method.

7. Prove the rule for finding the G. C. M. of two quantities. Find G. C. M. of $x^3 + c^2y + 3xy^2 + y^3$ and $x^3 + 3x^2y + xy^2 - y^3$.

8. Solve

(i) $\frac{3-x}{3+x} - \frac{2-x}{2+x} + \frac{1-x}{1+x} = 1$

(ii) $x^2 + 4.8x + 2.87 = 0$

(iii) $\sqrt{2+1-\left(\frac{1}{2-1}\right)^{-1}} = 0$

9. Extract the square root of $32 + 10\sqrt{7}$.

10. Solve (i) $x+y=a, x^2+y^2=14x^2y^2$

(ii) $\begin{cases} \frac{(x+y)^2}{a^2} + \frac{(x-y)^2}{b^2} = 8 \\ x^2 + y^2 = 2(a^2 + b^2) \end{cases}$

(iii) $\begin{cases} (x+y)(x^3+y^3) = 1216 \\ x^2 + xy + y^2 = 49 \end{cases}$

(iv) $x^2y^2 = a, y^2zx = b, z^2xy = c$.

11. If a side of a triangle be produced, the exterior angle is equal to the two interior and opposite angles; and the three interior angles of every triangle are together equal to two right angles.

The difference of the angles at the base of any triangle is double the angle contained by a line drawn from the vertex perpendicular to the base and another bisecting the angle at the vertex.

12. To describe a parallelogram that shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle.

13. The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles.

If two opposite sides of a quadrilateral figure inscribed in a circle be equal, prove that the other two are parallel.

SOLUTIONS.

3. Let r denote the rate, and t the time;

then since the discount is the excess of the principal sum over the present worth, we have

$$D = P - \frac{P}{1+rt} = \frac{Prt}{1+rt} = \frac{P \cdot Prt}{P+Prt} = \frac{P \cdot I}{P+I}$$

$$\frac{1}{D} = \frac{P+I}{P \cdot I} = \frac{1}{I} + \frac{1}{P}$$

4. First income = $\frac{4}{96} \times \text{£}3360 = \text{£}140$

2d = $\left(\frac{3}{82\frac{1}{2}} + \frac{8\frac{1}{2}}{164\frac{1}{2}}\right) \times \frac{94}{96} \times \frac{\text{£}3360}{2} = \text{£}145$

5. (i) $\frac{7}{8}$ (ii) $\frac{ax+by}{ax-by}$ (iii) $2a \left(\frac{a^2+b^2}{a^2-b^2}\right)^2$

6. $2x^3 - 7x + 3$.

8. (i) 0, $-2 + \sqrt{-1}$, $-2 - \sqrt{-1}$.

(ii) $-4 \cdot 1$, -7 .

(iii) $\sqrt{2+1} = \left(2-\frac{1}{x}\right)^{-1}$

$\therefore \left(2-\frac{1}{x}\right)^{-1} = \frac{1}{\sqrt{2-1}} = (\sqrt{2-1})^{-1}$

$\therefore \frac{1}{2-\frac{1}{x}} = \sqrt{2-1}$.

$\therefore \frac{1}{2-\frac{1}{x}} = \sqrt{2} = \frac{1}{2^2} \therefore x = 2$.

10. (i) $xy = a$ (1)

$x^4 + y^4 = 14xy^2$ (2)

Add $2x^2y^2$ to each side of (2) and extract

the sq. rt. and we have $x^2 + y^2 = 4xy$, also from (1) $x^2 + y^2 = a^2 - 2xy$.

$\therefore 6xy = a^2$ &c.

(ii) Simplifying the first eqn. we have

$(a^2 + b^2)(x^2 + y^2) + 2(b^2 - a^2)xy = 8a^2b^2$

hence substituting $2(a^2 + b^2)$ for $x^2 + y^2$

we have $(a^2 + b^2)^2 + b^2 - a^2, xy = 4a^2b^2$

$\therefore 2xy = 2a^2 - 2b^2$

Adding this to the 2d eqn. we get

$(x + y)^2 = 4a^2$ or $x + y = 2a$ (1)

similarly by subtraction we get

$(x - y)^2 = 4b^2$ or $x - y = 2b$ (2)

Adding and subtracting (1) and (2) we obtain $x = a + b$, $y = a - b$.

(iii) The first eqn. takes the form

$(x^2 + y^2 + 2xy)(x^2 + y^2 - xy) = 1216$.

But $x^2 + y^2 = 49 - xy$, hence we have

$(49 + xy)(49 - 2xy) = 1216$

$\therefore xy = 15$ (1)

Adding (1) to 2d eqn. gives $x + y = 8$ &c.

(iv) Multiply the eqns. tog'r and we have

$x^2y^2z^2 = abc \therefore xyz = \sqrt[3]{abc}$, then divide each eqn. by this last result.

11. ABC the triangle, AD perp. to BC, AE bisecting BAC, D being between E and C; then $\angle DAB + \angle ABD = \text{rt. ang.} = \angle DAC + \angle DCA$
 $\therefore \angle ACB - \angle ABC = \angle BAD - \angle CAD$; but since BAE eq. EAC \therefore BAE is greater than DAC by EAD \therefore BAD is greater than DAC by twice EAD.

13. ABCD the quadl., AB eq. CD; join BD then since AB eq. CD \therefore arc AB = arc CD. \therefore ang. ADB eq. DBC \therefore AD is parallel to BC.

ARITHMETIC.

SECOND CLASS, JULY, 1877.

1. Prove the rule for reducing a mixed circulating decimal to an equivalent vulgar fraction.

Find accurately what fraction

$\frac{5}{8}$ of $\left(\frac{7}{9} - .512\right)$ of $3.6\frac{7}{12}\frac{7}{3}$ ac. is of 2.662601 acres.

2. Show how to find the L. C. M. of two or more numbers. Find the L. C. M. of 483

bushels; 472 bushels, 2 pecks; 258 bushels 3 pecks.

3. A merchant buys flannel at 32 cents per yard; at what profit per cent. must he sell it in order that the money he receives for 220 yards may be equal to his gain on \$480 of outlay?

4. Three watches hang side by side, and

all show 12 o'clock at the time of observation ; the first is known to gain 10 minutes, and the second to lose 10 minutes every 12 hrs., while the third keeps accurate time ; when will all the *minute* hands be next at 12 together ?

5. How many ounces of coinage gold are equal in value to 112 ounces of coinage silver, 1869 sovereigns weighing 40 lbs. Troy, and 66 shillings weighing 1 lb. Troy ?

6. Distinguish between bank discount and true discount. If the simple interest on a sum of money for a given time and rate is $\frac{1}{n}$ of the sum itself, show that the true discount is $\frac{1}{n+1}$ of that sum.

7. Reckoning commercial discount at 5%, a person would receive \$44.52 less than the nominal value of a note which has a year to run ; what should he receive for the note if true discount only were deducted ?

8. What must a person have invested in Bank of Commerce stock at 120 and paying 4% half-yearly dividends, if a transfer of 65% of his capital to Dominion Bank stock, at 130 and paying 4½% half-yearly dividends, makes a difference of \$5 in his semi-annual income ?

9. A merchant in Montreal drew on Hamburg for 6,000 guilders at \$415 ; how much more would he have received if he had ordered remittance through London to Montreal, exchange at Hamburg on London being 11¼ guilders for £1, and at London on Montreal, 9¼, brokerage being 1¼% for remitting from London ?

SOLUTIONS.

2. These quantities reduce to 1932, 1890 and 1035 pecks respectively ; the L. C. M. of these is 86,940 pecks or 21,735 bushels.

3. \$480 outlay bought 1,500 yards ; there-

fore, what he receives for 220 yds. is the gain on 1500 yards, or what he receives for 11 yds. is the *gain* on 75 yds. ; therefore, what he receives for 64 yds. must be the *cost* of 75 yds., so that in selling 64 yds. 11 yds. are gained, that is, $17\frac{3}{8}$ per cent.

4. The hands will be together when the first has gained and the second lost an hour ; and this, at the rate of 10 minutes in 12 hours, will require 72 hours.

5. 12 oz. silver are worth 66s.
 \therefore 112 " " " 616s.
 £1869 gold weigh 480 oz.
 \therefore £623 " " 160 oz.
 623s. " " 8 oz.
 616s. " " $7\frac{3}{8}$ oz.

6. If the interest is $\frac{1}{n}$ of the sum, then \$1 is the interest on \$ n .
 \therefore \$ $(1+n)$ is the amt. of \$ n .
 \therefore \$ n is the pres. w. of \$ $(1+n)$,
 \therefore \$1 is the disc. on \$ $(1+n)$,
 that is, the discount is $\frac{1}{1+n}$ of the sum.

7. 5% of the note is \$44.52, \therefore whole note is \$890.40 and the pres. w. of this for 1 yr. at 5% is \$848.

8. The proceeds of 13 shares in the Commerce will purchase 12 shares in the Dominion. The income from this in the Commerce is $(14 \times 4 =) 52$; in Dominion $(12 \times 4\frac{1}{2} =) 54$; hence by a transfer of 13 shares \$2 are gained, and \therefore by $32\frac{1}{2}$ shares \$5 will be gained ; but this is 65%, \therefore whole amount is 50 shares, that is, \$5,000 stock or \$6,000 invested.

9. If 1 guilder = \$.415, 6,000 g. = \$2,490 ;
 but 6,000 g. = £6,000 \div 11¼
 $= \$6,000 \div 11\frac{1}{4} \times \frac{10}{9} \times 1.09\frac{1}{4} \times \frac{100}{107\frac{1}{4}}$
 $= \$2,557.65$: \therefore gain is \$67.65.

CHEMISTRY.

INTERMEDIATE FORM.

1. What is meant by a "simple" and a "compound" substance?

2. How would you prepare pure Nitrogen?

3. How many cubic millimetres of Oxygen at 15°C and 752 mm pressure do I need to burn 79 cubic centimetres of Hydrogen at 47°C and 749 mm.?

4. How many oxides of Nitrogen are there? Give name, symbol, molecular weight, and density of each.

5. Describe and explain the preparation of (a) Chlorine, (b) Potassium Chlorate, (c) Bleaching Powder.

6. How would you proceed to detect the presence of a soluble (a) Chloride, (b) Iodide and (c) Fluoride?

7. How would you show that water is not an element (a) analytically, (b) synthetically?

8. How would you detect the presence of Arsenic in solution?

ANSWERS.

1. (a). "Simple" substances are those out of which nothing different from the original body can be obtained: and it is generally believed that they consist of only one substance, e.g. from pure silver nothing but silver can be obtained, so with gold, sulphur and other bodies; these bodies are therefore called "Simple."

(b). "Compound" bodies are those from which, two or more different substances may be obtained, each of which differs from the others, and also from the original body. Oxide of Mercury may be resolved into Oxygen and Mercury—it is therefore called a "Compound" body.

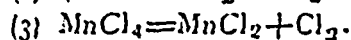
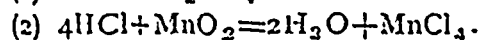
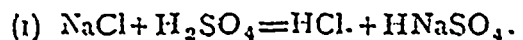
2. Pure Nitrogen is obtained by passing air (which has been purified by passing through Potassium K, moistened with Sulphuric Acid H_2SO_4 to absorb the watery vapor and Ammonia, and Caustic Potash KHO to absorb the Carbonic Acid CO_2) over red hot finely divided copper in a porcelain tube; the copper takes the Oxygen from the air forming copper Oxide CuO , and the Nitrogen may be collected.

3. 79 cc will become $\frac{79}{1} \times \frac{273}{320} \times \frac{760}{760} = 66.42$ cc at 0°C and 760 mm, and as 2 parts H. unite with 1 of O, 66.42 cc of H will require $\frac{66.42}{2} = 33.21$ cc of O at 0° and 760 mm: but this O is measured at 47°C and 749 mm: therefore $\frac{33.21}{1} \times \frac{273}{273} \times \frac{760}{752} = 35.48$ cc, or 35.48 mm ans.

4. There are five Oxides of N as follows:

	Name.	Symbol.	Molecular wt.	Density.
1	Nitrogen Monoxide,	N_2O	44	22
2	" Dioxide,	N_2O_2 or NO	30	15
3	" Trioxide,	N_2O_3	76	38
4	" Tetroxide.	N_2O_4 or NO_2	46	23
5	" Pentoxide,	N_2O_5	108	54

5. (a). Chlorine is usually prepared from one of its compounds as Sodium Chloride, by heating it with Sulphuric Acid and Manganese Dioxide. These substances are brought together in a flask and on the application of heat Cl. is evolved. The reaction expressed generally is $2(\text{Na. Cl.}) + 2\text{H}_2\text{SO}_4 + \text{MnO}_2 = \text{NaSO}_4 + \text{MnSO}_4 + 2\text{H}_2\text{O} + 2\text{Cl.}$ or expressed particularly to show different steps of the reaction:



(4) The excess of H_2SO_4 combines with the MnCl_2 forming $\text{MnSO}_4 + 2\text{HCl.}$, and the HCl. again attacks a fresh molecule of MnO_2 ,

&c. To obtain the gas pure it may be passed through a wash bottle. It cannot be collected over water as it is soluble in it, nor over Mercury, as it forms Mercury Chloride with it, but it may be collected by downward displacement, since it is heavier than air.

(b). When Cl. is passed into a solution of Potassium Hydroxide, Potassium Chloride and Potassium Hypochlorite are formed, thus $2\text{KHO} + \text{Cl}_2 = \text{KClO} + \text{H}_2\text{O} + \text{KCl}$, but this only takes place when the solution is cold. If the solution be hot no Potassium Hypochlorite will be formed, but Potassium Chlorate $6\text{KHO} + 3\text{Cl}_2 = 5\text{KCl} + \text{KClO}_3 + 3\text{H}_2\text{O}$. If the cold solution, through which Chlorine has been passed, be boiled, the Hypochlorite will be changed into the Chlorate $3\text{KClO} = \text{KClO}_3 + 2\text{KCl}$, for Potass. Hypochlorite is decomposed by heat into Potass. Chloride and Potass. Chlorate.

(c). Bleaching powder, or Chloride of Lime $\text{CaCl}_2 + \text{CaCl}_2\text{O}_2$ is a mixture of Calcium Chloride and Hypochlorite, and is obtained by the action of Chlorine on slaked lime. Chlorine gas, prepared as in (a) above, is passed into large chambers, on the floors of which a layer of slaked lime, about two inches thick is laid, the gas is all absorbed, and bleaching powder is formed. The reaction is $2\text{CaH}_2\text{O}_2 + 2\text{Cl}_2 = 2\text{H}_2\text{O} + \text{CaCl}_2 + \text{CaCl}_2\text{O}_2$.

6. (b). When Argentic Nitrate is added to a soluble Chloride, a precipitate of Argent Chloride is formed, which is soluble in Ammonia, $\text{NaCl} + \text{AgNO}_3 = \text{NaNO}_3 + \text{AgCl}$, or again by adding Mercurous Nitrate $\text{Hg}_2(\text{NO}_3)_2$ to a soluble Chloride as $2\text{NaCl} + \text{Hg}_2(\text{NO}_3)_2 = 2\text{NaNO}_3 + \text{Hg}_2\text{Cl}_2$, the precipitate formed, Mercurous Chloride, or Calomel, is white, but on the addition of Ammonia it is blackened—*or* another $\text{MCl} + \text{MnO}_2 + \text{H}_2\text{SO}_4 = \text{Cl. gas formed}$ —known by its smell and bleaching power. (M is used here as a *general* term for any metal, &c.)

(b). The presence of free Iodine manifests itself at once by the brown color it gives to a solution. Argentic Nitrate gives with a soluble iodide a yellowish white precipitate of Argent Iodide, which is insoluble in Am-

monia, but turns white by the addition of it: *or* mix a soluble iodide with a starch solution and on the addition of a drop or two of Chlorine water, a blue color will be formed.

(c). The presence of a Fluoride may be detected by introducing the solution to be examined into a platinum vessel along with some Hydric Sulphate, and placing over the vessel a piece of glass, coated with wax, on which figures have been traced. On heating the vessel if a Fluoride be present, Hydric Fluoride will be formed, and will manifest itself by etching the exposed part of the glass.

7. *Analytically*.—Fill a glass vessel with acidulated water, to enable it to conduct electricity, invert two test tubes filled with water over the two terminals of a battery. The test tubes will be filled in a short time by two gases which may be tested, and it will be found that the gases are Oxygen and Hydrogen in proportion of 2 vols of H. to one of O.

Synthetically.—Fill the eudiometer with Mercury and invert it over a vessel of that metal. Hydrogen is passed in—say 100 vols—also Oxygen—say 75 vols,—the mixture is then fired by the electric spark, they unite with an explosion, and the column of Mercury rises, and we shall find 25 vols of gas left, which is found to be pure O. We thus see that 100 vols of H. require 50 vols of O. for complete combustion; hence water consists of two vols of H. and one of O.

8. Arsenic in solution may be detected by the evolution of Arseniuretted Hydrogen, on adding Zinc and Sulphuric Acid to the solution to be tested, on burning the gas evolved, Arsenic will be deposited in the metallic state upon a piece of cold Porcelain held in the flame. If any compound of Arsenic be heated on charcoal in the inner blow pipe. flame the characteristic garlic odor of Arsenic will be noticed.

Marsh's Test.—Into a wide-mouthed flask fit a cork through which a funnel passes nearly to the bottom, and another tube, having a bulb in it. Fit this last tube into another larger one containing Calcic Chloride, and to

the end of this last fit a quill glass tube drawn out to a capillary end. Put Zinc and dilute Sulphuric Acid into the flask till Hydrogen is evolved freely, and when the air is all expelled apply the flame of a lamp to the shoulder or

beginning of the narrowed part of the tube. Then pour into the flask the solution to be tested. If Arsenic be present, it will be deposited as a steel gray ring just beyond the spot at which the heat is applied.

ENGLISH GRAMMAR.

EXAMINATION PAPER.

(Answered by Miss Ina Sutherland.)

I. Mention the euphonic changes produced by the "s" of the plural and account for them.

ANS.—One of the Anglo-Saxon terminations for the plural was *as*; this was in time changed into *es*, which always has a flat sound. Through the influence of the Norman-French, *s* became the present termination for the plural.

The difference in pronunciation of *s* is due to its two-fold origin—flat *s* being from the Anglo-Saxon and sharp *s* from the Norman-French.

The sharp final consonant of A S. words must be changed for euphony to the corresponding flat mute when followed by flat *s*.

When *es* is added to Anglo-Saxon words in *f*, this consonant is assimilated to the soft sound of *es*, and is pronounced *v*. Words ending in *ff*, *rf* and *f*, when preceded by two vowels, are exceptions to this rule (*roof*, *reef*). Exceptions to the exceptions are *loaf*, *thief*, *staff*. Nouns in *fe* add *s* and change *f* into *v* also; exceptions, *fifes*, *strifes* (probably from the Norman influence). Words of Norman-French origin, ending in *f* take sharp *s* and remain unchanged; except *beef*, *beeves*; *staff*, *staves*. (*Mason*, art. 48.)

II. State the principal relations that

may be expressed by the possessive (Saxon or Norman.)

ANS.—The principal relations expressed by the possessive, are the following:—

(1.) The partitive relation—A piece of wood.

(2.) The relation of material—A bar of iron.

(3.) The relation of possession—My mother's ring.

(4.) The relation between a person or thing and its characteristics—A man of honor.

(5.) The relation between an action and its source—Tempted of sin.

(6.) The relation between an action and the ground or cause of it—To die of a fever.

(7.) Relation between a time and its co-relative action—The thirty years' war.

(8.) The objective relation—The love of fame.

(9.) The subjective relation—The bite of a serpent.

III. Distinguish between an abstract and a concrete term. Show how we arrive at the idea of an abstract term.

ANS.—An abstract term corresponds to something which has no external objective reality, and, therefore, can only be conceived of as having an

existence. A concrete term is one, the idea of which can be obtained directly through the senses.

The manner in which we arrive at the idea of an abstract term is the following:—Suppose several objects to be presented before us. Amongst these we discover some one quality which is common to each of them. We direct our attention towards this quality till at length we draw it away from the objects altogether and think of it as something having an existence entirely independent of that to which it belongs. The operation of the mind required in this process is called abstraction, hence the terms arrived at in this way are called abstract terms.

IV. Discuss, correcting or justifying:—

(a.) No laws are better than the English laws.

(b.) That is applied to persons as well as things.

(c.) Personification is when we ascribe sentiments or action to inanimate beings or abstract qualities.

(d.) He never doubts but that he knows their intention.

(e.) Every thought and every feeling are opposed to it.

(f.) Than whom none higher sat.

(g.) What sort of a looking man is he?

ANSWERS:—

(a.) This sentence is ambiguous; it may mean that the absence of all law is better than the English law, or that there are no laws existing better than the English laws. The latter is probably the meaning intended, therefore we may change the construction and word it thus: "There are no laws superior to the English laws."

(b.) The present form of this sentence would imply that things are applied to persons as well as "that." better, "That is applied to persons as well as to things."

(c.) "Personification is when," an

indefinite way of beginning a definition, also, the relation of the phrase "or abstract qualities" is ambiguous. "By personification we ascribe life sentiments or action to inanimate beings or to abstract qualities."

(d.) "He never doubts that he knows their intention."

(e.) "Every thought and every feeling is opposed to it." Two or more nouns connected by *and* and preceded by *each*, *every*, *no*, require a verb in the singular.

(f.) "Than who none higher sat"—None sat higher than who sat high.

(g.) "What sort of looking man is he." This form of expression is, however, inelegant and should be avoided.

V. Write notes on the words italicized in the following sentences:—

(a.) *My being here* it is that holds thee hence.—*Shak.*

(b.) I remember *meeting him*.

(c.) *Lady Macbeth walking* in her sleep is an incident full of tragic horror.

(d.) His *teaching* children was necessary.

ANSWERS:—

(a.) *My* is a possessive pronoun, in attributive relation to the noun *being*. *Being* is a verbal noun; but the whole expression *my being here* must be taken together and regarded as the predicate nominative after the verb *is*. *Here* is an adverb modifying *being* in its verbal capacity.

(b.) *Meeting* is a gerund, because it is not only used as a noun, but also admits of an object after it. It is the object of *remember*. *Him* is the object of the word *meeting*.

(c.) *Lady Macbeth* is the grammatical subject; *walking* is a present participle, because, besides its office as a verb, it expresses quality and is used in attributive relation to *Lady Macbeth*. The logical subject of *is* is the whole phrase, *Lady Macbeth walking in her sleep*.

(d.) *Teaching* is another example of a gerund, having *children* as its object.

VI. In stanzas 8 and 9 of Gray's *Elegy* parse *let*, *mock*, *grandeur*, *hear*, *all*, *that*, *alike*, *but*.

ANS.—*Let*, a transitive verb in the active voice, imperative mood, and in the second person plural, to agree with its subject *you* understood; *mock*, a transitive verb, in the active voice and in the infinitive mood, depending on *let*; *grandeur*, noun, abstract, personified and used as a proper noun, third person singular, masc. gender, and the object of the predicate verb *let*; *hear*, parsed in the same manner as *mock*; *all* is an indefinite pronoun, third person singular, one of the subjects of the verb *await*; *that*, a relative pronoun, neuter, third person singular, to agree with its antecedent *all*, and in the objective case, governed by the verb *gave*; *alike*, an adverb, modifying verb *await*; *but*, an adverb, modifying phrase *to the grave*.

ANSWERS TO THE JUNIOR MATRICULATION PAPER ON ENGLISH, AT TORONTO, 1870.

BY A STUDENT.

1. Discuss the correctness and comparative value of the following forms of expression, (those in italics),

(a). *I commence to build to-morrow.*

“ “ *building* “

“ “ *the building* “

“Begin” would be a better word than *commence* in the first and second sentences, but it would not do in the third; we *begin* an action but *commence* a permanent operation. In the first sentence the common form of the infinitive is used; in the second the infinitive in “ing” is used; this is the modern form of the old infinitive in “an” which was used without the preposition “to”; in the third, “building” is am-

biguous, it may be the gerund or the verbal, but it is in reality a noun formed from the old noun ending in “ing”.

(b). *A man's hand*. In this case *hand* is emphatic, special attention being called to it. In *the hand of a man*, *man* is emphatic. Of course we could convey the same idea in first as in the second by emphasizing *man's*, both are subjective and somewhat synonymous.

(c). *A man's description* is subjective and means the description given by a man. *The description of a man* is objective, and means the description given of someone by a man. (b) and (c) show that sometimes the two forms are identical in meaning and sometimes not.

(d). *The king's enemies*, and *the king's traitors* are examples of the objective genitive. This first expression is equivalent to “the enemies of the king”; the second is going out of use, and means “traitors to the king”.

(e). *Your fear and your dread* is an example of an obsolete use of the possessive pronoun for the objective genitive, as in “Your rejoicing which I have in you”. *The fear of you and the dread of you*. This is the objective genitive, and means the fear and dread which someone has of you; it is almost identical with the last, but places more emphasis on “you”.

(f). *I am told that he had been gone an hour* means that he had been gone an hour when some past event happened. *I am told he went an hour ago* merely refers to the fact that he went away an hour before the present time.

2. Explain the following distinctions grammatically:

He is a swifter messenger than writer means that he is a swifter messenger than he is a swift writer.

“*He is a swifter messenger than a writer*” means that he is a swifter messenger than a writer is a swift messenger.

In *I am come*; *He was gone*; *was*

gone and *am come* refer to the result of the action. The use of the verb *to be* as the auxiliary in the formation of compound tenses is the one sanctioned by history. In A. S. the participle with *to be* agreed with the subject and when "have" was used, with the object. (See article on Verb in the February number). *Have come* in the sentence *I have come* shows the action that brought about the present state of being come.

A good glass of ale means a glass well-filled with ale; and in "a glass of good ale", the reference is made to the quality of the ale. This is an example of the different meanings the same adjective may have by being placed in different parts of the sentence. General Rule: The adjective should be placed as near as possible to the substantive it immediately qualifies.

The frequent ellipsis after *than* is a fruitful source of ambiguity. The supplying of the ellipsis in such sentences as the following will usually clear up the meaning: *A man may be a better soldier than a logician*, supplying the ellipsis, "a man may be a better soldier than a logician may be a soldier", makes the meaning clear.

A man may be a better soldier than (he is a) *logician*.

In *it was hanged* and *it was hung*, the first refers to death by hanging. The participle *hanged* is never now used in the sense of mere suspension.

3. "The English of the Anglo-Saxon period was an unmixed language and it was what is called a synthetic language."

Explain the grammatical changes referred to.

1st. The Anglo-Saxon period in English extends from the time of the first settlement of the Saxons down to 1050 A. D. It was unmixed because the grammar and the vocabulary came from the same source—the Maeso-Gothic division of the Teutonic branch of language. It was called synthetic,

that is, having its inflections placed after the root-word (*postpositional*), instead of having the inflections placed before the root-word (*prepositional*) as in modern English. Anglo-Saxon changed from a synthetic language to an analytic, first, by confusion being introduced into the inflections by the invasion of the Danes; second, the copious introduction of Latin and French words; and third, by the gradual substitution of prepositions and case-endings for terminations showing the inflection.

4. Can a sentence be formed without a verb?

Parse.—Every one to his taste; Great wealth, little weal; That greatest of rarities, a really wise man.

A grammatical sentence cannot be formed without a verb, though in some condensed sentences the verb may be understood.

The parsing of these sentences will be obvious when the ellipsis is filled out; as, (Let) every one (act) to (or, according to) his taste; (He who possesses) great wealth (has) little weal; The greatest of rarities (is) a really wise man.

5. Show by what process, modern English expresses complex past and future tenses, and discuss the gain or losses thereby produced.

We use *have* and *been* in the formation of compound tenses. When an action is completed we speak as if we possessed it, hence we use *have*, and *be* denotes continued action, and *be* is past. The two methods, synthetic and analytic, of forming the past tenses are really the same; we have not adopted *have*, but have shifted it from the back to the front of the word; as, *am abam*, *am*, the root, meaning to love; *m*, the personal ending; and *ab-habeo*, the same as the English *have*. This loss of inflection has made our sentences less involved, but has restricted the variety of meaning. By the use of auxiliary verbs, we can express our

thoughts with more accuracy, and show the more minute shades of meaning; for example, in the first person of the future, *shall* has quite a different meaning from that which it expresses in the second and third persons, etc.

6. "Strictly speaking there is no mood in English verb."

What is implied by this? In what sense are moods of the English verbs spoken of? Specify them.

It means that the verb does not undergo distinct change in form to express the different moods. The infinitive is a noun, the participle an adjective, the potential mood a mere combination of words, so with the compound subjunctive, while the inflection for the subjunctive consists only in dropping the personal endings.

The moods in English are determined by the meaning of the verb; if the assertion be declared as a fact, the verb is said to be in the indicative mood; if only thought of, in the subjunctive.

The indicative mood makes the simple assertion that something is done, has been, or will be done.

The subjunctive mood denotes uncertainty or dependence on something else expressed.

The imperative conveys the assertion in the form of a command.

The infinitive states what the action is without affirming it of anyone or limiting it in any way.

7 Point out each nominative and determine the best grammatical form here.

I was asked a question by him.

A question was asked me by him.

He asked a question of me.

The verbs that govern two objects in the active may take two forms in the passive. The last is the full form of the active.

Whichever word we wish to make the most prominent, must be placed as the nominative of the verb. In the first sentence *I* is the prominent word, in the second, *question*, etc.

8. Explain use of double negative

here, as distinguished from the positive.

He was not unwelcome.

He was welcome.

The first implies toleration, but does not assert that he was welcome; the second expresses that he was welcome and gives prominence to welcome. There is another variety of this first that did not escape the notice of the Rhetoricians: they gave it the name of Litotes from *λίτος* (litos) slender. It sometimes makes a very strong statement by denying the opposite as: "He was no fool."

10. Are the following sentences (in italics), correct? Point out what is peculiar in each.

I saw it with my own eyes. Here the assertion is not made as to how I saw, but to the fact that *I* saw it, and this fact is made more prominent by the emphatic adjective, *own*.

He himself did it. The emphatic pronoun *himself* is a pleonastic appositive used to emphasize the reference of the sentence to *he*.

He is gone to home, is the full form but the frequent omission of *to* has now led to *home* being used in an adverbial sense so completely that *to* would be improper.

He fell ill. This is not idiomatic, we say he *took* ill, he *fell* sick.

He regarded her with extremest indifference. Strictly speaking *extremest* should not be used, for *extreme* is a superlative already, but it was frequently used in Old English for emphasis and is so occasionally yet.

There was quite a number present. It would be better to say "there were," since the idea of plurality is prominent in the phrase "quite a number."

He opinionated that it was so. The verb *opionate* is a new-fangled Americanism that happily has never taken root here.

I concluded to stay: determined, resolved, decided, made up my mind, would be better. *Conclude* is to infer from reasoning, to terminate, but it is also used to indicate decision.

PUBLIC SCHOOL DEPARTMENT.

SPELLING.

HOW best to teach spelling is a subject that has received no inconsiderable attention in both our High and Public Schools, and although great efforts have been put forth to master the intricacies of English spelling, no easy path has as yet been discovered. It is, therefore, quite apparent that the sound of a word is not always a correct criterion for spelling that word, and hence other means have to be used. Of these, written exercises are the most valuable, since we spell more by sight than by sound. The forms of words are impressed on the mind as pictures, and these appear marred when any of the letters forming the word are omitted or misplaced. Memory is then called into play to restore the harmony that should exist, and the proper succession of letters will usually suggest itself to the mind, more particularly if the word has frequently been seen. From what has already been said, it is apparent that to impress the forms of words upon the memories of pupils is the most important thing to be attended to in teaching spelling. The manner of doing this in detail must be left, to a great extent, to the judgment of each teacher. Variety in this, as well as in every other exercise in the schoolroom, is of the utmost importance, since doing the same thing in the same way in the schoolroom from day to day, renders it not only monotonous but positively irksome to the pupils. Let teachers then exercise a certain amount of ingenuity in changing the routine of each particular lesson, so as to keep the attention of their pupils and arouse

them to greater diligence in their studies.

The old and time honored method of memorizing column after column of meaningless words from the spelling book or dictionary, or of giving isolated words from any of the lessons taught, without the pupil having a clear conception of the meaning of the words given, is still in vogue in some of our schools. The following observations are made with a view to direct the attention of teachers to a more excellent way, and to assist both them and their pupils in reducing to a minimum the labor necessary to acquire a correct habit of spelling.

In order to form a true estimate of the value of an exercise in spelling, it is necessary to consider the relation it bears to language and culture. Spelling can only be considered as one of the accomplishments of learning, and nothing more, for the relation it bears to written language is similar to that which correct pronunciation bears to spoken language. Bad spelling is a deformity of composition, and, as such, should receive the most careful attention of teachers, so that our pupils shall at least know how to spell correctly the words in ordinary use. Those who possess cultured minds and are conversant with literature are seldom poor spellers, for the reason that their familiarity with language impresses the form of the word upon their memory. If the English were strictly a phonetic language, words would be spelled differently from what they are now, but their sense would be just the same. Spelling would then be the

analysis of words into the simple sounds which compose them, and the representation of these sounds by their appropriate letters. The English language, however, does not conform its spelling to the phonetic principle, since many letters composing words are silent, while others represent more than one sound, and many sounds are represented by more than one letter.

Oral spelling should precede written spelling, because the pupil must know how to spell the word orally before it can be written properly. With a class of beginners oral spelling may be commenced by giving single words, and after these have been spelled correctly they may be combined into short phrases. In these classes the words spelled should be limited to those contained in the reading lessons, or the names of familiar objects. After the pupils have learned how to spell these words, both singly and in phrases, they should be required to write or print them on their slates, and those exchanged, so that no pupil shall have his own. In correcting these exercises, the teacher should call upon one of the pupils to name the first word that is found mis-spelled in the exercise which he has corrected. This word should be written on the black-board by the teacher, with the spelling of it the same as on the slate; the pupil should then give the correction, which should also be written on the board, so that the whole class may see and decide which is right. If the word be mis-spelled in both cases, the class should be asked to give the correct spelling, and failing in this the teacher should make the necessary correction, and require the class either to repeat it a number of times or write it, as may be deemed best. In oral spelling, the words given should be pronounced clearly and distinctly and in a natural tone of voice, without any variation from the ordinary approved pronunciation. No word should be pro-

nounced more than once by the teacher, and pupils should be required to divide words into syllables, though not to pronounce each syllable separately. Pupils should be required to pronounce the words or phrases before spelling them. In the junior classes it is advisable to allow the pupils to copy exercises in spelling from their books until they have made sufficient progress to enable them to write from dictation with ease.

The introduction of exercises in oral spelling to the more advanced classes, from time to time, will be found of great service, inasmuch as a greater number of words can be spelled in the same time. It is by the frequent spelling of the same word that the order of succession of the letters composing that word is impressed upon the memory. Dictation, however, should always be used as the principal method of teaching this subject. One of the most important features in connection with the teaching of spelling is the proper correction of errors. Indeed, too much care cannot be taken in this respect, for it is by this means that the pupils learn wherein they are most liable to make mistakes, and by correcting these, they in time become good spellers. In all cases, after the pupils have learned how to spell a limited number of words, oral spelling should be given by phrases, these phrases repeated by the pupils and then spelled. In this manner it will serve as an introductory exercise to written spelling, and enable the pupils to retain in their memories, whole phrases, while writing them. As the number of words likely to be used by the majority of pupils in after life will be limited to the words used in ordinary conversation, the names of things used in every day life, such as the commodities sold in the different shops, the names of tools used in husbandry and by tradesmen, it would be well to give dictation exercises in

which these names occur. For this purpose, extracts from newspapers, especially from articles on finance and trade, navigation and commerce, the markets, advertisements, auction sales, and the like, will be found of great

value. Selections of acknowledged literary merit may be frequently used for dictation to advanced classes, and these, if preserved, may be the means of cultivating a taste for good literature. S.

SUMMARY OF CANADIAN HISTORY.

FIRST PERIOD :—1497 TO 1759.

John Cabot and son, Sebastian,
Fourteen ninety-seven (1497), came
From the port of Bristol, England,
In King Henry Seventh's name.
First they sighted Prima Vista,
As they called the *New Found Land*,
With its stretch of gloomy forest
And its mighty bank of sand ;
Afterwards Prince Edward Island,
Nova Scotia, and N. B.,
Which the French, a few years later,
Named the Land of Acadie.
Three years after, (1500), Cortereal
Crossed the ocean's wide expanse ;
Then the French sent Verazzani,
And he called the land New France.
Then Jacques Cartier, a Frenchman
Bold, ambitious to explore,
Found and named the Gulf St. Lawrence,
Fifteen hundred thirty-four (1534).
One year after (1535), this brave sailor
Up the river took his way,
Looking for a route to China,
And discovered Canada.
What in English, we call *village*
Indians call a *kanata* :
Cartier thought they meant the *country*,
So he called it *Canada*.
Where the mighty river narrows—
Indians call a *strait*, *kebec*—
Stood the Village, Stadacona,
Where is standing now *Quebec*.
Next he came to Hochelaga,
Neatly built of logs, though small,
On a large and fertile island
Which is now called Montreal.
Near the village stood a mountain,
Royal Mont he called its name ;
Long years after, sixteen 'leven (1611)
Rose the city called the same.
Humphrey Gilbert sailed from London
Fifteen hundred eighty-three (1583),
Came to claim the land for England,
But his ship was lost at sea.
So the French still held the country,

Sending rulers one by one,
But the Indians being hostile
Little settlement was done.
David Kertk, while Champlain governed,
Seized the land as England's due,
Sixteen twenty nine (1629) he took it,
Gave it back in thirty-two (1632).
Quebec city, first one founded—
Sixteen eight (1608) was by Champlain ;
Here he died a few years after,
And his ashes still remain.
Frenchman still succeeded Frenchman,
As the ruler of the land ;
Immigration slowly followed,
Backward flowed, or seemed to stand.
Our Ontario—all forest
At this time—was little known ;
And where stand our swarming cities
Roamed the savages alone.
France and England, long unfriendly,
Came at length to open blows ;
And before the war was ended
Canada engaged the foes.
First to rise was last to totter—
Old Quebec was last to fall ;
Wolfe, without, lead on the English ;
Montcalm, the French inside the wall.
England conquered, France was beaten,
Wolfe and Montcalm both were slain ;
Canada thus came to England,
Ne'er to leave her fold again.

SECOND PERIOD 1759 TO 1792.

Nova Scotia and New Brunswick—
Once Acadia—had been
Ceded by the Utrecht Treaty,
Signed in seventeen thirteen (1713.)
France confirmed this by another,
Seventeen forty-eight (1748), Chapelle,
But the two were but one province
At the time of which I tell.
When Quebec and France surrendered
On the Plains of Abraham,
English rule was substituted
Storm subsided into calm.
And by further final treaty

Signed at Paris sixty-three (1763),
 France to England gave forever
 Canada and Acadie.
 Over all one name extended—
 British North America—
 And the names of Upper, Lower,
 Were unknown in Canada.
 Thirteen years from Paris treaty (1776),
 July 4th—spread eagle dates—
 Thirteen colonies revolted,
 Called themselves *United States*.
 These were anxious the Canadians
 With the *Union* should come in ;
 But Canadians were loyal,
 As they ever since have been.
 After seven years of struggle,
 Seventeen hundred eighty-three (1783),
 England yielded up the question,
 Let the colonies go free.
 In the States there still existed
 Many men to England true ;
 These—*United Empire Loyalists*—
 Soon to us for refuge flew ;
 For the States, with cruel hatred—
 Meaner spite was never found—
 Seized their lands, and goods, and chattels,
 Burnt their dwellings to the ground.
 Thousands came to us for shelter :
 Proud is he who now can tell
 That his father's father's father
 Was a hunted U. E. L.
 Nova Scotia and New Brunswick,
 Seventeen eighty-four (1784) were made
 Into separate provinces,
 But Canada one province stayed.
 Ninety-two (1792) this period ended,
 Canada had greater grown,
 York (Toronto) was a village ;
 Hamilton was still unknown.

THIRD PERIOD 1792 TO 1840.

The British Commons ninety-one (1791),
 A bill had carried through,
 Known as the "Constitutional Act,"
 Enforced in ninety-two (1792)
 It made two Canadas of one—
 An "Upper" and a "Lower"—
 And gave a Parliament to each ;
 There had been *none* before.
 This system—"Representative"—
 Was popular ; but a bill
 That passed with it—Clergy Reserve—
 Was fraught with direst ill.
 For English clergy was reserved,
 In stipends to be paid,
 One-seventh part of all the lands
 In U. C., unsurveyed.
 This led to furious future strife,
 For other Churches claimed
 The land belonged as much to them
 As to the clergy named.
 In fifty-four (1854) these lands were sold :

Each Municipal Board
 Received a share for public use,
 To spend, or loan, or hoard.
 Both Houses met in ninety two (1792),
 The Capitals of the day
 Were—one, Quebec ; and Newark, one,
 Now called Niagara.
 Next year U. C. led Freedom's cause,
 Abolished Slavery ;
 Ten years passed by and then L. C.
 Did so in eighteen-three (1803),
 In ninety-six our capital
 Was taken from Newark
 To what is now Toronto—then
 'Twas "Dirty Little York."
 Our population, eighteen-four (1804)
 Was sixty thousand—one
 Not twice as large in all U. C.
 As dwells in Hamilton.
 Old England claimed the *Right of Search* :
 Made her intention known
 To search and take from Yankee ships
 Deserters from her own ;
 And further, while she fought the French
 'Twas not a friendly thing
 For Yankee ships to trade with France,
 And aid and comfort bring.
 This led to war in eighteen-twelve (1812),
 And many men were slain
 At Queenston Heights and Chrysler's Farm,
 La Colle and Lundy's Lane ;
 At Chippewa and Stoney Creek,
 Fort Erie, Chateauguay—
 Until at last, at New Orleans,
 The Yankees won the day.
 Eighteen-thirteen 1813 one Hamilton,
 In search of farming lands,
 Moved in the wood that thickly stood
 Where Hamilton now stands.
 From thirty-five (1835) to forty-one (1841),
 Throughout the whole extent
 Of Canada, Rebellion leagued
 With brooding discontent.
 The French and English Lower C.
 Had quarrels by the score.
 The Family Compact, Upper C.,
 Caused full as many more.
 The Clergy Act of ninety-one (1791),
 Which Colborne put in force
 While Governor in thirty-six (1836),
 Caused bitterness, of course.
 At length Mackenzie, thirty-seven (1837),
 Our capital assailed ;
 But he was forced to flee for life,
 And his rebellion failed.
 Some "Yankee sympathizers" sought
 To aid the fallen chief ;
 But Britain took the matter up,
 And brought the land relief.
 In forty 1840) England passed a Bill
 The Union to restore :
 Both Canadas were joined in one,
 As they had been before : (1791),

The *Government Responsible*
To Parliament to be.
This took effect in forty-one (1841),
And ended Period Three.

FOURTH PERIOD:—1841 TO 1867.

Kingston was made the capital
Of both the Canadas ;
Good laws were passed, but jealousies
Revived in various ways.
The eighteen forty (1840) Union Act
Was hardly full in force
Before the wedded provinces
Were clamoring for divorce.
Lord Sydenham, the Governor,
Died from a fatal fall.
The capital in forty-four (1844)
Was moved to Montreal.
The malcontents mobbed Elgin there—
This caused him to resign—
And burnt the House of Parliament
In eighteen forty-nine (1849).
The Queen endorsed Lord Elgin's acts,
He then as Governor stayed ;
Toronto and Quebec by turns
The capital were made.
Sir Edmund Head was Governor
In eighteen fifty four (1854) ;
In fifty-eight (1858) the capital
To Ottawa we bore,
Lord Monck to take Sir Edmund's place
Came out in sixty-one (1861) ;
That year the Yankee war commenced
And " Fenian scares " begun.
This robber horde in sixty-six (1866)
Assailed " Fair Canada ; "
We whipped them back with the Union Jack,
Fort Erie and Ridgeway.
This marks the close of period four.
And with it passed away

Old systems—next July the first
Was first Dominion Day.

FIFTH PERIOD :—1876 TO —.

Monck was followed by Lord Lisgar—
Sir John Young was then his name,
For the title, " Baron Lisgar,"
With Confederation came.
In July of sixty-seven (1867),
Party strife was laid aside,
Four old provinces united
And a new Dominion tried.
By the B. N. A. enactment
Canada was " twain " once more :
Nova Scotia and New Brunswick,
With these two, made up the four.
Eighteen seventy (1870), " Red River,"
To its interests alive,
Under name of Manitoba,
Made another—number five.
Reil had raised an insurrection,
Sixty nine (1869)—it was subdued,
And the rebels fled the country
For their own and country's good.
Frederick Temple (Earl of Dufferin)
Came to steer the ship of state,
Eighteen-seventy (1870)—the Marquis,
Lorne, succeeded seventy-eight (1878)
B. Columbia and Vancouver
Made the sixth in seventy-one (1871)
Seventh, came Prince Edward Island,
Seventy-three (1873)—the list is done.
North and east Keewatin District
Stretches to the frozen pole ;
North and West a territory—
Canada includes the whole :
All except a single province—
Newfoundland—some future day,
She will claim confederation
With the rest of Canada.

G. W. J.

As far as we know, the following pretty little arithmetical trick has never been published : Tell a person to write down a number of dissimilar digets under 1,000. Tell him next to write down the same digets in the reverse order, and to subtract the lesser number from the greater. He is then to state the unit figure of the remainder, and you at once tell him the whole of the remainder. The result will be as under. The middle figure will always be a nine, and the other two figures

added together will always equal nine. Thus, suppose he writes, 472 ; reversed, 274 ; remainder 198. He states the unit figure of the remainder to be 8. You at once announce the remainder 198. The trick may be varied by letting the person tell you the hundred figure of the remainder (if there is no hundred figure the remainder will be ninety-nine), or by giving him the choice of either the hundred or the unit figure.—*Can. Baptist.*

COLLEGIATE INSTITUTES AND HIGH SCHOOLS.

ENTRANCE EXAMINATION, JUNE 27th and 28th, 1876.

Examiners, { County (City or Town) Inspector (or in certain cases a person appointed by him), *Presiding Examiner*.
 { Chairman of the High School (or Collegiate Institute) Board.
 { Chairman of the Public School Board.
 { Head Master of the High School (or Collegiate Institute).

No. 1.

ARITHMETIC.

N. B.—FULL WORK REQUIRED.

1. Bought $19\frac{1}{2}$ yds. Irish linen at $\frac{5}{4}$; $16\frac{3}{4}$ yds. calico at $\frac{1}{8}$, and $16\frac{1}{2}$ yds. silk at $\frac{8}{4}$; find the amount of the bill in dollars and cents.

2. Add together $\frac{3}{4}$ of $\frac{5}{8}$ of £2 5s., $\frac{2}{7}$ of 3 guineas, and $\frac{2}{7}$ of £1 18s. 6d., and reduce the result to the decimal of £25.

3. If a pipe discharge 2 hhd. 23 gal. 2qt. 1pt. of water in one hour, in how many hours will it discharge 11 hhd. 25 gal. $1\frac{3}{4}$ pt., the water flowing with the same velocity?

4. Add together, $\frac{16}{\frac{7}{15} \text{ of } 2\frac{9}{11} \times \frac{1}{3\frac{1}{2}}}$, $\frac{\frac{1}{27}}{1\frac{2}{3} \text{ of } 3\frac{9}{10}} \times \frac{1}{11}$, and divide the result by $\frac{3\frac{2}{3} \text{ of } 5\frac{1}{4} \text{ of } 7\frac{1}{2}}{63} - \frac{1}{3\frac{1}{2}} - \frac{\frac{1}{7} \times \frac{1}{11}}{\frac{1}{3}}$

5. A man's annual income is \$2,400; find how much he may spend per day so that after paying a tax of 2 cents $7\frac{1}{2}$ mills on every dollar of income he may save \$582 a year (365 days).

6. A room is 36 feet long and 24 feet wide; find the difference in the expense of carpeting it with carpet a yard wide at \$1.40 a yard, and with carpet 27 inches wide at \$1.15 a yard.

7. If 162 gallons of water will fill a cistern 4 ft. 4 inches long, 2 ft. 8 inches broad, and 2 feet 3 inches deep, how many cubic inches are contained in a pint?

8. Three men can mow a field in 6 days; they mow together for two days and then one of them ceases work, and the other two finish the field in 7 days; find how long the man who ceased work at the end of the second day would have taken to mow the whole field by himself.

9. A man sold two city lots for \$600 each; on the one he gained $\frac{1}{4}$ of the price it cost him, and on the other he lost $\frac{1}{4}$ of the price it cost him; find his entire loss on the sale of the two lots.

10. A drover bought a number of cattle for \$4,375, and sold a certain number of them for \$43 a head for the total sum of \$3,655. gained \$680, for how much per head must he sell the remainder so as to gain \$400 more.

NOTE.—Ten marks for each question.

No. 2. GRAMMAR.

Values	
20	1. Give the masculine or feminine form, as the case may be, of hero, sultana, countess, executor; the plural of money, lily, folio, gas, brother, pea, cargo; the comparative and superlative degrees of far, ill, funny; the past tense and past participle of lead, sit, loose, pay, stay, shoe.
45	2. Parse: "On returning home last Friday night, we found no small excitement in Uncle Charles's household, owing to our long continued absence.
10	3. Analyse: "St. Augustine! well hast thou said That of our vices we can frame A ladder, if we will but tread Beneath our feet each deed of shame."
15	4. Correct the mistakes of the following sentences, giving your reasons: (a) The river has raised six inches this morning. (b) I expect we will have quite a few out to-night. (c) Of the two Henries, this is the youngest. (d) Don't he know that I would like to have went with him? (e) I went and lay down to rest.
6	5. What is meant in Grammar by "qualify," "proposition," "gender"?
4	6. Into what classes are pronouns divided? Give an example of each.

No. 3. GEOGRAPHY.

Values	
10	1. Name the principal rivers of Europe that flow into the Baltic, the North and the Mediterranean seas, respectively: and say what countries or districts are drained by them.
10	2. Name the mountain-chains of Europe and give their position; also the countries of Asia, with their relative positions, and the capital of each.
15	3. Draw a map of the counties of Ontario bordering on Lake Huron; and mark on it the chief towns and rivers.
15	4. Where and what are the Crimea, the Skaw, Jersey, Valetta, the Hebrides, Morocco, the Ebro, the Hague, the Levant, Socotra, Hainan, Teneriffe, Sierra Leone, Corfu, Jutland?
12	5. State accurately the position of the following:—Anglesea, Berne, Limerick, Cairo, Madras, Odessa, Antwerp, St. Hyacinthe, Pembina, Minas Basin, Pictou, Servia.
10	6. Describe the course of the Saskatchewan, the Rhine, and the Richelieu, and mention the principal cities or towns on the last two.

No. 4. SPELLING.

Values	
8	1. State the rules for the use of capital letters.

Values		Values	No. 6. COMPOSITION.
8	2. In the following passage, point out (i.) The diphthongs. (ii.) The silent letters. "Southward with fleet of ice Sailed the corsair, Death ; Wild and fast blew the blast, And the east wind was his breath." — <i>Longfellow</i> .	18	1. Transpose— " Suddenly upon the greensward All alone stood Hiawatha, Panting with his wild exertion, Palpitating with the struggle ; And before him, breathless, lifeless, Lay the youth with hair dishevelled, Plumage torn, and garments tattered, Dead he lay there in the sunset." — <i>Longfellow</i> .
4	3. Distinguish 'lie' from 'lay,' 'doe' from 'dough,' 'sighs' from 'size,' 'soar' from 'sower.'	20	2. Change the construction of the following sentences :— " Each of the layers or seams of coal indicates a distinct period of vegetable life." " We cannot read well unless we practice reading." " I shall come that I may see you." " A horrible sight soon disclosed itself."
4	4. Each of the following combinations of letters represents two words. State in each case what the meaning is when the diphthong is pronounced like <i>ou</i> in out, and when it is pronounced like <i>o</i> in no. Bow. Lower. Row. Sow.	10	3. Form a sentence containing two dependent propositions, using the word <i>school</i> for the subject of the principal verb.
4	5. Accent:—Ally, arithmetic, character, horizon, lunatic, bitumen, harass, sedentary.	24	4. Write a letter to a friend giving him an account of what you have been doing during the last six months.

LITERARY AND BOOK NOTES.

CURIOUS AND COSTLY BOOKS

"Our religion itself is founded in books," says Bartholin, "and without them God is silent, justice dormant, physic at a stand, philosophy lame, letters dumb, and all things involved in Cimærian darkness." A Saxon King once gave away an estate of 800 acres for a single volume entitled "Cosmography; or the History of the World,"

such were the scarcity and value of books in those times. A book was often entailed with as much solemnity as the most valuable estate. In the year 1174, one Walter Prior purchased of the Monks of Winchester, "Bede's Homilies and St. Austen's Psalter," for twelve measures of barley and a pall on which was embroidered in silver the history of Birinas converting a Saxon King.

During the early epochs of the Christian era, literature underwent the most devastating vicissitudes; religious intolerance and fanaticism destroyed some of the most precious annals of the past; Jew, Christian and Pagan alike vented their malice on the productions of genius. Said Omar, "Either these books are in conformity with the Koran, or they are not; if they are, they are useless; and if not, they are evil; in either event, therefore, let them be destroyed." Such was the logic that devoted to destruction 700,000 manuscript volumes of the Alexandrian library! The earliest public library of which we have any record was that of Osymandyas, who reigned in Egypt 600 years after the deluge. That of Pisisstratus, in Athens, dates 550 years B. C. The next was the great Alexandrian collection. Then followed in the order of time the several great libraries of Europe.

Among the earliest illuminated MSS. is the renowned Codex Argenteus, so named from its being written in liquid silver upon violet-colored vellum. Within a few years an ancient MS. copy of a portion of the New Testament, written in the Franca language, has been discovered at Rheims Cathedral. Its date is the eleventh century, and it is supposed to have been used in administering the coronation oath to the Kings of France.

Among the numerous rare and costly relics contained in the library of the Vatican is the magnificent Latin Bible of the Duke of Urbino; Olfric, the Saxon monk, deserves especial mention as having achieved the good work of rendering portions of the old Testament into his vernacular tongue. Lanfranc was another laborious, erudite scribe to whose toils the Christian world owes much.

There were upwards of 6,000 early copies of the Bible and portions of the Sacred Scriptures, in various languages, in the library of the late Duke of Sussex.—*Exchange*,

SAYINGS AND WHO FIRST SAID THEM.

(Selected.)

Many of our common sayings, so trite and pithy, are used without the least idea from whose mouth or pen they first originated. Probably the works of Shakspeare furnish us with more of these familiar maxims than any other writer, for to him we owe: "All is not gold that glitters," "Make a virtue of necessity," "Screw your courage to the striking-place" (not point), "They laugh that win," "This is the short and long of it," "Comparisons are odious," "As merry as the day is long," "A Daniel come to judgment," "Frailty, thy name is woman," and a host of others.

Washington Irving gives us "The Almighty Dollar," Thomas Morton queried long ago "What will Mrs. Grundy say?" while Goldsmith answers, "Ask me no questions and I'll tell you no fibs." Charles C. Pinckney gives "Millions for defense, but not one cent for tribute." "First in war, first in peace, and first in the hearts of the fellow-citizens" (not countrymen), appeared in the resolutions presented to the House of Representatives in Dec., 1790, prepared by Gen. Henry Lee.

From the same we cull, "Make assurance doubly sure" "Christmas comes but once a year," "Count their chickens ere they are hatched," and "Look before you leap."

Thomas Tasser, a writer in the sixteenth century, gives us, "It's an ill wind that turns no good," "Better late than never," "Look ere you leap," and "The stone that is rolling can gather no moss." "And cry and no wool" is found in Butler's "Hudibras."

Dryden says: "None but the brave deserve the fair," "Men are but children of a larger growth," and "Through thick and thin," "No pent up Utica contracts our power," declared Jonathan Sewell.

"When Greeks join Greeks then was the tug of war," Nathaniel Lee, 1692.

"Of two evils I have chosen the least," and "The end must justify the means," are from Matthew Prior. We are indebted to Colley Cibber for the agreeable intelligence that "Richard is himself again." Johnson tells us of "A good hater," and Mackintosh in 1791 (the phrase often attributed to Jno. Rindolph), "Wise and masterly inactivity."

"Variety's the spice of life," and "Not much the worse for wear," Cowper. "Man proposes, but God disposes," Thomas A. Kempis.

Christopher Marlowe gave forth the invitation so often repeated by his brothers in a less public way, "Love me little, love me long." Edward Coke was of the opinion that "A man's house is his castle." To Milton we owe "The paradise of fools," "A wilderness of sweets," and "Moping melancholy and moon-struck madness."

Edward Young tells us "Death loves a shining mark," "A fool at forty is a fool indeed," but alas, for his knowledge of human nature when he tells us "Man wants but little, nor that little long."

From Bacon comes "Knowledge is power," and Thomas Southerne reminds us that "Pity's akin to love." Dean Swift thought that "Bread is the staff of life." Campbell found that "Coming events cast their shadows before," and "Tis distance lends enchantment to the view." "A thing of beauty is a joy forever," is from Keats. Franklin said, "God helps them who help themselves," and Lawrence Sterne comforts us with the thought, "God tempers the wind to the shorn lamb."

Even some of the "slang" phrases of the day have a legitimate origin, "Putting your foot in it," is certainly not a very elegant mode of expression, but, according to the "Asiatic Researches," it is quite a fine point of law; when the title of land is disputed in Hindostan, two holes are dug in the

ground and used to incase a limb of each lawyer (?), and the one who tired first lost his client's case. Fancy, if you can, some of our famous "limbs o' the law" pleading in such a manner! It is generally the client who "puts his foot in it."

When things are in disorder they are often said to be turned topsy-turvy; this expression is derived from the way in which turf used for fuel is placed to dry, the turf being turned downward; and the expression then means top-side turfway.

We have received a copy of the new edition (the fourth) of Prof. Cherriman's *Trigonometry**, edited by Mr. Baker, Mathematical Tutor, University College, Toronto. In this edition the text of former editions has been revised, new matter has been added, and numerous exercises—selected largely from the University Examination Papers—have been arranged to illustrate fully every part of the work. In addition to this, tables of four-figure logarithms of numbers and of the trigonometrical ratios have been appended, and nearly a dozen of the University Examination Papers in trigonometry inserted in full. Answers also, to all the examples are given.

The work, having been originally intended almost solely for the use of students at the University, contained no exercises. This great drawback to its extensive introduction into High Schools and other training institutions has been overcome by Mr. Baker, who has merited the thanks of teachers and students in making the work so complete in itself, and adapting it so thoroughly to the wants of intending University Matriculants.

*Plane Trigonometry as far as the solution of triangles, by J. B. Cherriman, M. A., Superintendent of Insurance for the Dominion of Canada; late Fellow of St. John's College, Cambridge; and formerly Professor of Natural Philosophy in University College, Toronto. Fourth edition edited by Alfred Baker, M. A., Mathematical Tutor, University College, Toronto. Toronto: Copp, Clark & Co.

PERSONALIA.

J. H. Long, Esq., B. A., formerly Modern Language Master of the Hamilton Collegiate Institute, has just entered into law partnership with A. V. McCleneghan, barrister and attorney-at-law, &c, in Brantford, Ont. Mr. Long, after severing his connection with the Coll. Inst. here, travelled for some time on the continent of Europe, visiting the chief places of interest in Southern France and Italy; on his return he accepted a position in the Brantford Coll. Inst., which he retained for a year. His achievements as a University student, his success as a High School master, and his brilliant career as a student-at-law, bespeak for Mr. Long success in his profession.

Mr. W. H. Snow, son of C. B. Snow, Manager of the Dundas Cotton Mills, has just graduated as an M. D., in the city of New York, with the highest honors; he was one of five, among two-hundred competitors, who obtained the requisite number of marks in Pathology and Practice of Medicine, entitling him to become a candidate for the Loomis Prize. The examination for this prize took place in the Academy of Music before an audience of seven-hundred. The examiner was Prof. Loomis himself; the judges were five eminent medical professors of the city. After a severe and exciting contest, which lasted three hours, the judges awarded to Mr. Snow this prize, which is considered the most honorable distinction awarded by the medical department of the University of New York City. To the people of Hamilton, the winning of this prize is a matter of special interest, as the recipient was for two years a student of the Collegiate Institute here, having passed successfully the Intermediate examina-

tion, and subsequently, the examination for "A. A." in the University of McGill College.

James K. Lawson, formerly of this city, but now of Rome, Italy, succeeded in passing the competition for admission to the classes (drawing from the nude) at St. Luke's, in January last. The competition lasted ten days, and only those who could draw from nature were admitted. Master Lawson competed in drawing and modelling, and won the honorable distinction of passing in both. He was formerly a pupil of Mr. Wonder, artist, of this city, and a student of the Hamilton Collegiate Institute. Messrs. Lawson and Drummond left Hamilton, and arrived in Rome last July, where they have lived ever since; the latter is studying modelling and sculpture.

The Hamilton Collegiate Institute has lost one of its most enthusiastic masters, and the *MAGAZINE* one of its most promising contributors, in the removal of Dr. Spencer to Windsor, N. S., where he fills the chair of Chemistry and Natural Sciences in the University of King's College, one of the oldest and most flourishing universities of that province. Our loss, however, is his gain, and we take pleasure in chronicling the fact of his promotion, as it shows a growing disposition to give important positions to the clever and meritorious men of our own country. This hope of preferment, if once the avenue towards reasonable fruition be opened, will be the highest incentive to earnest work, and may be instrumental in inducing clever young men to remain in the teaching profession. Already we have men who think it worth while to devote time and means in preparing themselves by

years of post-graduate study at foreign institutions for professorial positions in the educational institutions of their native land. Of this class is Dr. R. B. Hare, who has recently returned from Germany, where he has spent four years in the old universities of that land of scholars.

Dr. Hare has been selected to fill the place in the Collegiate Institute here, left vacant by Dr. Spencer's departure. The school is to be congratulated on the choice made in securing the services of an able, learned and enthusiastic man, devoted to the advancement of science and education.

WHO IS RESPONSIBLE?

SOME writers would judge the school by the action of the pupils on the street, at home, and at church. It is true that the influence of the school is somewhat felt here, but that it is the principal incentive to the conduct of its pupils while out of school, should not, and cannot with justice, be charged to the school.

On the contrary, the action of the pupils at home, on the street, and at church is a correct indication of their willingness, or unwillingness, to be influenced by right at school. One who is well behaved at home is easily managed at school. One who defies authority on the street, is overbearing and ungovernable at school. The people of any district make their school. As are the people, so is their school. Are the people law-abiding, moral, and clean-mouthed? then are the pupils orderly decent, and genteel. It is as impossible to much elevate a school above the moral and social status of the people among whom it is placed, as it is to make good citizens of Nez Percés, or Comanches. In fact the average boy is more influenced by his grown-up brothers and companions, than by school influences. The merchants, shop-keepers, loungers at stores and at saloons, and the community in general, make a public opinion against which it is as unwise and

useless to contend, as it would be useless to ask the thistle to produce figs, or the wild thorn to produce grapes. Children follow evil with more alacrity than they follow good.

It is possible for a few evil-disposed young men in a community, to so ridicule and laugh down every effort for the correct training of youth, that it will be impossible to establish and maintain good government. It is possible for our business men, by incautiously listening to the exaggerated stories of their boy customers, to so seem to flatter and encourage them in their fancied (manly?) exploits that a spirit of insubordination will spring up, such as to defy all efforts to stay or overcome. It is impossible for the parents of children, by freely commenting upon the imperfections of the school system, and by listening to and believing their children's one side of the story, to break down all semblance of respect for order and authority, even in the school-room.

And, without the least hesitation, we say, that the good or bad order in school depends more upon public opinion of the place, than upon the teachers. No teacher can govern well without the cordial and hearty co-operation of a large majority of the community. No school will be a success until the community feel that each has a duty to do, and that each is alike

responsible for the welfare and good government of the community. The teacher cannot shirk his duty. He must, day after day, come in contact with the children, and more or less with the parents. The cases are very rare in which he has not a sincere desire to improve the school and do his pupils good. Almost invariably, his aim and lifelong work is to change the boys and girls into gentlemen and ladies. Too often, he fails. Too often the apathy and indifference, or worse, the opposition and uncharitableness of the community, have turned what might have been success and honor into miserable failure. In such instances, the whole censure is placed on the teacher, and he is made to bear the result, not of his own bad management, but of the lack of support which the community were in duty bound to give him. A good school is a possibility in a community, whenever the good, influential part of it determine to sustain a reasonably good teacher, in spite of all petty jealousies, and in spite, at times, of what may seem a trifle irregular. At least, allow the teacher to commit one-fourth as many blunders as would be excused in a congressman or a man of business. The public school should be sustained and fostered by every member of the community: indeed, it should be the pride and boast of all; and, since a community is judged abroad by its school at home, every one should feel a proud personal interest in its reputation as in his own, and see to it that he neither disgraced it nor allowed it to disgrace him. It is time that we ceased to lay our responsibilities upon others, or that we take upon ourselves the duties which we ourselves owe to the community. Each and every man and woman is directly responsible for the actions of the community. So long as we allow our public meetings, our lectures, our church gatherings, to be annoyed, disturbed, and made unendurable by hoots,

whistles, cat-calls, and general rowdiness; so long as we allow our nights to be made hideous by gangs of young men racing and howling in our streets, so long may we expect our schools to be disorderly and unsatisfactory. But when our city governments shall see to it that order prevails on our streets at night and by day; when our churches and Sunday schools shall determine to have and enforce good order; when we can have a public lecture, in either hall or church at which there shall be no ruffianism; when, in short, our public will so respect themselves as to compel others to respect their rights; whenever and wherever this state of affairs exists, then and there can be had a good, successful, and orderly school, and genteel orderly pupils will go trooping home quietly and without carrying off any one's gates. The best teachers in the world cannot do it without the co-operation of the people, and nothing can relieve us of our personal responsibilities. The good of the common school demands the co-operation of every man and woman of the community.—*Barnes' Educational Monthly.*

FACETIÆ.

Student, fresh from College, to Conductor; "I wish to get on the penultimate car." Conductor: "we have no peanut car; you can take the Smoker."

The reason why the ancients took the owl for an emblem of wisdom was because he saved his talk and filled his stomach. Remember this when you are invited to a banquet.—*Detroit Free Press.*

What is your name? asked a teacher of a boy. "My name is JULE," was the reply? whereupon the teacher impressively said: "You should have said JULIUS, sir." "And now, my lad," turning to another boy, "what is your name?" "BILLIOUS, sir."

SCENE: Sophomore's room (Soph., just returned from town, is struggling with his Spanish. Enter serious Junior Soph. loq.)—'Well—hic—this is the meanest language I—hic—ever saw And—of—all—the dictionaries this is worst! hic—but guess the grammar's worse! Haven't been able to find a single word!' (Junior calmly points out that it is difficult to do Spanish satisfactorily with a German dictionary and a Greek grammar. Exit Sophomore to bed.)

He was an honor man in moderns and was looking frantic. He had searched two hours for a "German prose composition" as he was heard to mutter between his outbursts of—French. Then he grew calmer, sadly sat himself down, and remembering that great men always say something before they die, exclaimed "I guess I didn't bring the *buch heim*."—*White and Blue*.

The mystery that a Rockland boy desires the advancing years to unfold is why he always is rushed off to bed when he is not in any degree sleepy, and made to get up when he is so sleepy that it seems as if his whole system was clogged with pitch.—*Spectator*.

A story is going the rounds in connection with the recent visit of Miss Neilson, the famous actress, to Toronto, which however, has not yet appeared in print. Of course everybody has heard of how the hearts of some hundreds of University students were mutilated by the appearance of the celebrated beauty. The story goes that when Miss Neilson, was taking her departure from the Toronto station, where a large crowd had assembled to bid her farewell, and where some hundreds of pairs of soft student eyes looked love to "eyes which spoke again" (it is understood Miss Neilson's eyes always do speak

love, whether there is any deep-seated passion or not), as she stepped upon the platform of the car she dropped—accidentally, of course—one of her garters. Then ensued a scene which beggars description, the scrambling of the entranced students for possession of the souvenir being something unsurpassed in the annals of the Queen City. The search after O'Donovan Rossa's cap on the occasion of his memorable visit was nothing to it. Of course one of the students secured the precious memento, and has now the honor of being a full fledged K. G., but its possession is likely to cost him dearly, as it is rumored he has already about a hundred and ninety-nine duels on hand in consequence.—*Spectator*.

"I know I'm losing ground, sir," tearfully murmured the pale faced freshman, "but it is not my fault, sir. If I were to study on Sunday, as the others do, I could keep up with my class, sir—indeed, I could; but I promised mother ne-ne never to work on the Sabbath, and I can't sir, ne-never," and as his emotions overpowered him, he pulled out his handkerchief with such vigor that he brought out with it a small flask, three faro chips and a euchre deck, and somehow or other the professor took no more stock in that freshman's eloquence than if he had been a graven image.

"That's where the boys fit for college," said the professor to Mrs. Partington, pointing to a school house. "Did they?" said the old lady with animation. "Then if they fit for college before they went, they didn't fit afterward?" "Yes," said he, smiling, and favoring the conceit. "but the fight was with the head, not the hands." "Butted, did they?" asked the old lady.—*Exc.*

A plucky thing to do; to get up for an examination without cramming.—*Punch*.