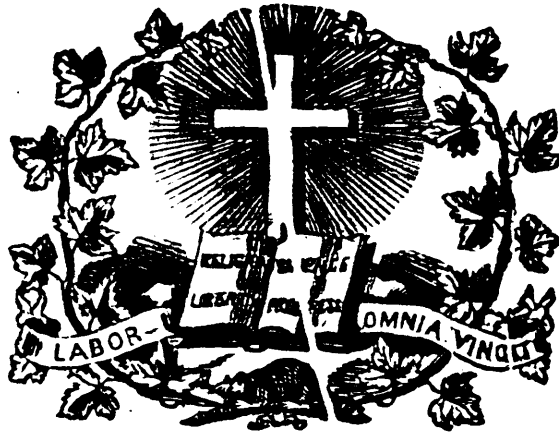


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THE  
**JOURNAL OF EDUCATION**

Devoted to Education, Literature, Science, and the Arts.

Volume XIV.

Quebec, Province of Quebec, February, 1870.

No. 2.

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will be read, without any teaching, by those whose taste lies that way; and scarcely any teaching could give them interest where it is not native to the student.

In Chaucer, we have the real beginning of the literary eminence of our country. No reading would dispense with Chaucer. But is an English master justified in taking up much time with him? True, he is so far charged with obsolete phraseology and forms, that he cannot be read without the assistance of a commentary. But it is not sufficient that the text should be edited and explained, and his beauties indicated in printed annotations? When you are sufficiently matured for the enjoyment of poetry of any kind, you will take delight in reading Chaucer for yourself, with no other aid than the notes of the "able editor." You will also find abundance of reviews and even attractive style, which you need no one by your elbow to expound. Doubtless the discussions on Chaucer's metre are a little dry, and might be the better for a coach; but I should say to the person that could not master the point without such help, that neither he nor mankind at large would be much worse if he left the matter alone.

It will be obvious that this line of remark upon Chaucer has an application far wider; that at least it extends to all the great poets. I mean it to be so extended. I hold that an English poet that has not of himself sufficient attractions to be read, understood, and relished, without the prelections of a university professor, is by that very fact a failure. He undertakes to charm the sense and fill the imagination of the ordinary reader, without more effort of study than is repaid on the spot at the moment; his return for any labor expended on him is immediate or nothing. Any special difficulties ensuing from remoteness of age, from the wide scope of his imagery, or from any accidental defects of his composition, may be removed by his elegant and admiring commentator, or be redeemed by his irresistible charms in other respects. If we are to allow a coach in addition to the editor and the review critic, the popular evening lecturer is quite enough. The youthful pupil's forenoon hours are too precious for this kind of work.

Let us come now to modern English, dating from Elizabeth. Here we have our greatest poet, and some of our greatest names in prose. Let us first dispose of the poet. I speak with the common sentiment of profound homage to the genius of Shakespeare.

**On Teaching English.**

(BY PROFESSOR BAIN, ABERDEEN UNIVERSITY.)

(Concluded.)

III.

The reasons why these critical exercises should be chiefly derived from good modern authors will be given under the remarks to be made on third division of the course of English—namely, ENGLISH LITERATURE.

In this wide field we have, first, the claim of the early English authors—those before Chaucer. If the criterion of utility is allowed, they may be soon disposed of. It is scarcely supposable that a student of this day should get one useful hint from the whole mass of these authors put together. They belong partly to the history of the language, and partly to the history of the country. They are proper to be published, edited, and commented on; they enter into the department of curious reading for the grown man; they do not belong, further than by cursory allusion, to the schoolmaster, hemmed in as he is at the present moment within such narrow limits of time. Either they do not require, or they are not susceptible of, the master's aid. They

Every one that has been in any way alive to his greater flights, will admit, I think, that they raise and distend the intellect beyond any existing compositions. In this respect their power is little dependent on the commentator. If there be any one qualified to add much to the force of the Shakespearian passages, it is the great actor and elocutionist; and, even without these, he will continue to exercise his potency. I could not vote to tax the nation for coaching Hamlet and Macbeth.

Of the prose writers of Elizabeth, I listen with amazement to any one recommending Hooker. Why, the men that superseded Hooker in every conceivable merit of thought and of style, are themselves superseded. In John Austin we are, at least, three removes from the "fustian" of Hooker.

Bacon still contains a certain amount of unexhausted interest, yet his style has more to be avoided than imitated. He has given birth to expressions that will be immortal in our language; and there are perhaps occasional felicities that have not become hackneyed. But the modern student may be satisfied with a few specimens of his peculiar genius.

I will not go on further, because the drift of the remarks will now be apparent. I cannot admit the necessity of going back to Elizabeth for studying style; and the objections would apply, although with decreasing force, to the ages succeeding. Even the great prose authors of the seventeenth century, before Cowley and Dryden, are wholly unsuited as guides to composition. Milton's prose contains stupendous bursts, worthy of his genius, but the structural part is in no respect to be commended. I should not be hard upon any one that found Barrow unreadable, and Tillotson the same. Cowley, Temple, and Dryden, succeeded by the men of Queen Anne, greatly alter the state of the case. Still, these are not the best masters of prose; the language did not culminate with them. Allowing for temporary mannerisms, English prose has improved steadily to the present hour. What, then, is the obvious course of the student? Is it not to devote himself to the men that realize the highest excellences before looking at inferior men? And the course of the student is also the course of the teacher. The great contemporary writers are to be first sought out. They are not perfect, any one of them; but the knowing teacher can turn their imperfections to good account. He has, as I conceive, no better line of instruction, no better exercise, than to discriminate the good from the less good in the most advanced of our literary composers. With them he should commence, and be principally conversant. He may go back and use, in decreasing percentage, the previous writers for a century and a half or two centuries; but he will find an increasing difficulty in remodelling, to ideal excellence, their sentences and paragraphs. Such, at least, has been my experience.

As regards, then, a course of English literature, I hold that—in so far as it is an elegant critical excursus wherein the historian vies with his subject authors in elegance and sparkle, being himself a literary artist—there is no need of enouncing all that from the professor's chair. The pupil should have it in print, and appropriate it in his own chair. The English teacher's concern with the literature of the past is to extract from it every thing that is of value for improving the diction of the pupils, and, in that view, the present, and not the past, is his mainstay. The situation is illustrated in the quaint innuendo of the old historian, Fuller, on Selden, the antiquarian, who was not a despiser of this world's goods. "Selden," says Fuller, "possessed a number of coins of the Roman emperors, and a good many more of our recent English kings." The wealth and purity and correctness of our diction may be found, in connection with our most improved thinking, and our living sources of interest, in the great writers of our own generation. From them, in point of fact, and in spite of all declamation about the old wells of pure English, we each derive our chief education in style; and the teacher, lending himself to the actual fact, can very much aid our progress in appropriating the best, and avoiding the inferior, forms of these exemplary writers. He certainly should know a good deal of the past; he should be ready with allusions to the forms and diction

of all periods of modern English. He could, in his own way, and having the main chance always before him, review the history of literature in a manner most instructive. But, when a man gets into literary criticism at large, the temptation to deviate into matters that have no value for the predominating end of a teacher of English, is far beyond the lure of alcohol, tobacco, or any sensual stimulation. He runs into digressions on the life, the character, the likings and dislikings, the quarrels and the friendships, of his authors; and even gets involved in their doctrines and controversies. Now, the critic of Milton's prose, if he is set up to teach English composition, ought to have nothing to say to the question of divorce, or to the merits and demerits of the Cromwellian supremacy. He should view Milton as a sentence-maker, a paragraph-composer, a rhetorician, a master of the English vocabulary; all the rest can be gained from other sources, and out of school-hours.

Throughout the foregoing remarks, I have been obliged to keep strictly in view our peculiar situation, as having so very little time to impart what is really a vast acquisition. The dead languages have as yet such a hold of the ground that only a mere corner can be got for our living tongue. Doubtless, if we had a share of the many hours devoted in the schools to Greek and Latin, we should not have to pronounce so severe an exclusion of Anglo-Saxon, of Elizabethan and seventeenth-century men, and of all the elegant literature of criticism, and in general of whatever is immediately pleasing in our subject. We might allow, now and then, a short digression, a momentary indulgence, in what we have so sternly reserved for the evening fireside or the popular lecture. But, such enlargement of our time and our opportunities as may one day arise from the collapse of the ancient languages, will be of small consequence, in my judgment, if it is not accompanied with the clear and firm conviction that the one thing needful, the ruling motive of an English master, is to discipline his pupils in the best modern English prose.

### School Discipline.

"Discipline," says a German writer, is not the art of rewarding and punishing, of making pupils speak and be silent; it is the art of making them perform, in the most appropriate, easy and useful manner, all the duties of the school."

If this definition is correct, school discipline has a more extended meaning than is generally supposed.

It cannot be confined to the government of the school, but applies equally to instruction and management. School-master and school-teacher, do not fully describe the person who educates our children. He is a school *disciplinarian*.

In other words, a good disciplinarian must be a good teacher; for correct teaching is one mode of discipline. And a good teacher is a disciplinarian for the same reason. Nor can good discipline or instruction be found in the school that is not managed with ability and skill.

It is the teacher's duty to call into activity the observation, industry, love of learning, capacity for independent action, and self-control of his pupils; to arouse and direct all his faculties; to discipline him outwardly and inwardly; to secure order, propriety, morality, good manners, obedience, regularity in coming, going, standing, sitting, and in preparing and reciting his lessons.

This is the work of school discipline, and these, if accomplished, are the results of teaching, managing, governing.

From this stand-point, our subject assumes a vast importance.

Indeed, lack of discipline is a radical, ruinous defect in any school; and in a large majority of the public schools in every community.

I deal not with *theories*, in this connection, but with *facts* gleaned from the practical life-work of the school-room. I would not dwell long upon the old thread-bare subject of corporal punishment, or the beautiful *theory* of moral suasion. These when separated from their proper connection with other and

equally important disciplinary agencies, can have but little practical meaning or use. Discipline is itself the great educational process. The well disciplined are always well educated, with or without knowledge; the undisciplined are uneducated, even if they possess all the wisdom of the cyclopædia.

The great work of the teacher is therefore to discipline his pupils. He cannot "add to their stature one cubit," or to their mental or moral capacity one new power. But he can bring them under such a process of training as will subdue their wild and untamed impulses, as will develop the latent energies of body, mind and soul, and direct them to a course of right action—so that the future citizen or lawgiver, may be fitted for his great work and high destiny.

School discipline has reference to all the regulations and prohibitions, restraints and stimulants which are calculated to regulate the habits of study and deportment, through the interesting and important period of school life.

It has been the good fortune of the writer, during the last thirty-five years, to have "seen service" in every grade of school and under various and complicated circumstances. He has been compelled in these relations, to study human nature, and to observe the working of different systems of school government, and all the methods and appliances usually adopted for the accomplishment of the desired object. It may not be thought presumptuous, therefore, if he views the subject from his own stand-point, and, in a measure, in the light of his own experience.

The object to be secured by school discipline is two fold; viz.: School vices must be prevented or cured, and school virtues cultivated.

Among the prominent school vices as they have been classified, are tardiness, idleness, whispering, disorderly movements in the school room, injury to property, and rudeness of speech or act, in the intercourse of every day life.

The school virtues to be cultivated are suggested as the opposite of these; viz.: regularity of attendance, promptness, obedience, truthfulness, earnestness, diligence, kindness, neatness, and thoroughness in the preparation and recitation of lessons. And these it is claimed, are to be secured, not only to promote the business of the school-room, but also for their influence in forming habits and character.

I propose in future articles, to enquire what are some of the disciplinary agencies to be recommended in the management, government and instruction of the school.

H. O.

Rhode Island Schoolmaster.

### Special Education for Women.

In the *Independent* will be found an article on "Margaret Fuller," contributed by Miss M. A. Ames, in which she criticises the great and prevailing want of an aim in the education of women.

"It is not," says she, "the want of native power, nor want of opportunity, nor the envious prejudice of men, which debars women from the places of personal independence and influence which they covet, so much as it is their own lack of accurate knowledge, of faculties disciplined to special uses. One born with the faculty divine may write rhymes and romance, if one only knows the alphabet; one may do no small amount of showy and shammy work with just a smattering of lore; one may play brilliantly with things in general, without knowing anything in particular; but there is a vantage ground of thought as well as of action, which no mere show can reach, before which all shams fail. In the highest degree to weigh, measure, compare, analyze and judge involves not only the natural power to do it, but a long discipline and preparation of that power for its finest use. The total lack of such discipline is the most distinguished fact in the average education of women. The number and names of their studies are appalling. They know a little of many things—nothing accurately or thoroughly. How many women, called

accomplished, who, if orphaned or widowed, are totally unable to earn a livelihood by instructing others in any branch of knowledge which they have been superficially taught! They are sure of nothing that they have studied! They possess no knowledge which they can make available; not a single power trained to use, not a mental gift which can command in gold an equivalent for its service! Thus through their very training inferior men are constantly taking the precedence of superior women. However little a man may know, he is usually sure of what he does know. His power, if limited, is at least available; and for success it is better to be able to do one thing perfectly than a thousand indifferently. How many bright women we know who are earning their bread in subordinate or menial positions solely through the want of the mental training which, did they possess it, would bear them at once to higher and better places. How many dull men we know full of authority, influence, and money, solely because their rather scanty powers were trained to special use; because they used them steadfastly for a definite purpose. Positions of responsibility and influence are constantly opening to women who are fitted to fill them. A few men may be envious and jealous about it—that is human nature; but even now there is nothing in their envy or jealousy which can prevent a woman from commanding the position which she has fitted herself pre-eminently to fill. Then would it not be more effective if the leaders who devote themselves to the interests of women should spend a little less time in lecturing men, and a good deal more in the special training of their daughters? It is too late to atone for the superficial education or the lack of it in the women of the present generation, who are already weighted with all the burdens of mature life. But it is *the* hour to train the woman of the coming generation; to educate her for the largest use of her faculties; to give her that special training, in whatever direction she shows the most talent, which will make her mistress of at least one of the arts of the world, which in any emergency will enable her to be a self-respecting, self-supporting being. Let her be trained as her brother is trained, with a reserved power to meet the vicissitudes of life. Then, if she escapes, she is but the richer; and, if not she may rejoice no less in the exceeding great reward of faculties trained to noble service. For such we commend Margaret Fuller as the most illustrious example of scholarship in woman which our country has yet given the world. Not but that we should be sorry to see the girl of our own period writing Latin poems at eight years of age, or digging out Greek roots before breakfast, or in any way teaching her brain at the expense of her digestion. This is not necessary. In Margaret Fuller's early days it was supposed that the head condescended to no relationship with the stomach. We know better. We know that there cannot be a healthy brain without a healthy stomach, and that physical culture must keep pace with all intellectual development. But the unthinking prejudice against high scholarship in woman has been, not that it injured her stomach, but that in some very unphysiological way it repressed her heart. Nonsense! A man may be a scholar or a thinker; he is no less manly, it doesn't hurt his heart. A woman because she studies and thinks is no less a human being; but the *more*, in the proportion which her whole nature grows. Thus Margaret Fuller, illustrious as scholar and thinker, is no less pre-eminant as a daughter, sister, wife, and mother. Her heart as capacious as her mind, compassed the fullness and sweetness of every human relation. Thus in the double perfect meaning we hold up her name as that of the grand typical woman of our country and time."

### The Abuse of Physical Exercise.

The *Westminster Gazette*, in the course of an article against too much physical exercise, observes, "Those who have gone through the severest training become, in the end, dull, listless, and stupid, subject to numerous diseases, and in many instances

the ultimate victims of gluttony and drunkenness. Their unnatural vigor seldom lasts more than five years. It was especially remarked by the Greeks, that no one who in boyhood won the prize at the Olympic games ever distinguished himself afterwards. The three years immediately preceding seventeen are years of great mental development; and nature can not, at the same time, endure any severe taxing of the physical constitution. Prudence, therefore, especially at this critical period of life, must ever go hand in hand with vigor; for the evils of excess outweigh by far the evils of deficiency."

We are always going to extremes in education, as well as in politics. The absolute neglect of physical development in the past generation we see followed in this by habits of exercise which threaten to make us a people of athletes and cripples. Not content with a rational use of the gymnasium, under the supervision of a teacher versed in physiology, developing *pari passu* the muscles and the intellect, as in the German universities, our youth aim each to be a Hercules, willing to be dunces if their arms and loins be strong. Hence the ball, and cricket, and boat clubs; hence the huge dumb-bells and Indian clubs, which strain and fatigue the muscles, and lay the foundation for many diseases of the limbs and internal organs. There was a time when hernia, or rupture, was principally confined to the laboring classes, among whom it is so common that it is safe to say that one in every fifth man you meet is affected with it in some degree. Now this infirmity is increasing among the students, many of whom lay the foundation for a life-long disease in the ill-judged exercises of the so-called "manly sports." We are not all the same, either mentally or physically; and exercise, like food and study, must be graduated according to the power of the individual. This distinction is generally overlooked; and the puny boy emulates the strong man, and subjects himself to vigorous efforts, and finds himself with distorted joints, rupture, and incipient disease of the heart and blood-vessels, while his more athletic rival becomes a better conditioned animal by the exercise. It is time,—now that a trained boat-crew, and an unsuccessful one at that, is received with public dinners and by city delegations—with the honors of illustration in pictorial papers and commendatory letters from clergymen—with the fulsome flattery that their four-mile rowing-match will be a powerful agent in maintaining the *entente cordiale* between America and England,—to ask ourselves the question if we are not carrying to a ridiculous extreme the power of muscle at the expense of brains and good health?

All physicians and physiologists are aware of the effects of rowing, as an exercise, on the heart and pulse. These effects have been carefully examined recently by Dr. Fraser, of Edinburgh, by means of the "sphygmograph," an instrument invented in France, which produces a self-written record of the swellings and contractions of the arteries. The delicate movements of these vessels, which the finger can not detect, are thus registered in a series of curves or waves, by a pencil on a strip of paper moved by clock-work. The "sphygmograms" of a crew of healthy persons before leaving the boat-house, and immediately after its return, are very different. The tracings show clearly that an extremely large quantity of blood is, in rowing, circulated with great rapidity, a condition of the circulation essential for the continuance of prolonged and severe muscular exertion. The effect of such a condition upon persons suffering from, or liable to, functional or organic diseases of the heart, can be easily conjectured. There can be no doubt that many incipient diseases of the heart and blood-vessels are rendered active and dangerous by the violent exercise of rowing; and that much discomfort, and premature death, are the result of this mania injudiciously and intemperately indulged in. As boat-crews do not, and can not, here submit themselves to "sphygmographical" examination, and thus enable the predisposed to heart-disease to retire in time to prevent further mischief, it may be a wholesome caution for the youthful oarsman to stop and consider, especially if violent exercise produces an uncomfortable

feeling in the heart and lungs, whether he will indulge in any thing more than a moderate pull. The effects of rowing on the circulation do not differ from those of many other forms of muscular exercise. It is the *violence* of such exercise, whether with the oar, the bat, or the Indian club, which is the dangerous element. While it is safe to row or play ball simply for amusement, it may be eminently dangerous to engage in a boat-race or a ball-match.—*Exchange.*

### The First Thousand Dollars.

The first thousand dollars that a young man, after going into the world to act for himself, earns and saves, will generally settle the question of business life with him. There may be exceptions to that statement; yet, as a rule, we think that it will hold true.

The first condition is that the young man actually earns the thousand dollars in question; that he does not inherit this sum; that it does not come by a streak of good luck, as the result of a fortunate venture in the purchase and sale of a hundred shares of stock; that it is the fruit of personal industry; that he has given his time and his labor for it. While he is earning and saving it, he must earn two or three, perhaps four times as much, to pay his current expenses. He is consequently held sternly to the task of industry for a very considerable period. The direct consequence to him is a steady, continuous, and solid discipline in the habit of industry, in patient, persistent forecast and self-denying effort, breaking up all the tendencies to indolence and frivolity, and making him an earnest and watchful economist of time. He not only learns how to work, but he also acquires the love of work; and moreover, he learns the value of the sum which he has thus saved out of his earnings. He has toiled for it; he has observed its slow increase from time to time; and, in his estimate, it represents so many months or years of practical labour. His ideas of life are shaped by his own experience.

The natural effects of earning the first thousand dollars we hold to be very large benefits. They are just the qualities of mind and body which are most likely to secure business success in after years. They constitute the best practical education which man can have as a worker in this working world. They are gained in season for life's purposes, at the opening period, just when they are wanted, when foolish notions are most likely to mislead an inexperienced brain, and when, too, there is a full opportunity for their expansion and development in later years. Men have but one life to live; and hence they start from opening manhood but once.

And the manner in which they start, the purposes they have in view, and the habits they form will ordinarily determine the entire sequel of their career on earth. To succeed, men must have the elements of success in themselves. One great reason why there are so many useless, inefficient, and poverty-stricken men—or rather boys seeming to be men—consists in the simple fact that they did not start right. A prominent reason why the children of the rich so frequently amount to nothing may be found in the luxury, ease, and indolence which marred the commencement of their lives. It is the law of God that we should be workers on earth; and no one so well consults the best development of his being as when he conforms his practice to this law. The workers in some suitable sphere are the only strong people.—*Ibid.*

### Children's Teeth.

(BY A DENTIST OF FORTY YEAR'S PRACTICE.)

We take the following from that excellent family paper, "Hearth and Home," and would recommend its study to those charged with the care of children.

"In order to form good teeth, the proper materials must be used to make them of; otherwise they will be defective in their structure, and liable to early decay.

The materials of which good teeth are formed are as follows:

Phosphate of lime, with traces of fluoride of calcium .....	67.72
Carbonate of lime .....	3.36
Soluble salts .....	0.83
Cartilage .....	27.61
Fat .....	0.40

The enamel or external covering of the teeth has a still larger proportion of the phosphate and carbonate of lime. These different constituents are furnished us in the food designed for our use. Other constituents are also thus provided, of which the soft tissues are formed. Although there are traces of the mineral element in other articles of diet, yet the largest supplies are found in the cereals, in the following proportions :

In 500 lbs. of whole grain (wheat) there is	
Muscle material .....	78 lbs.
Bone and teeth materials .....	85 "
Fat principle .....	12 "
500 lbs. of fine flour contain muscle material.	65 "
Bone and teeth material .....	30 "
Fat principle .....	10 "

Thus we see that the Creator has not only provided the proper materials for building up the human system with all its parts, but he has also given us a fixed standard of proportions for each material to be used, which we should recognize as correct; but instead of doing so, we change the proportions of the mineral element (which is deposited in the outer portion of the grain) by bolting out nearly two thirds of it from every barrel of flour, and discarding it from the staff of life, simply because it is the fashion to have our bread made of the finest flour, that it may be white, instead of dark.

Now, it is estimated that a healthy child consumes half a barrel of flour in a year; and if this be fine, white flour, the child is denied twenty pounds a year of that portion of the grain which contains the proper materials for bones and teeth. This deficiency of the mineral element in the food causes the teeth to be comparatively soft and chalky in their structure; and the result is, in this country, where fine flour is principally used for bread, there is not one in twenty without more or less decayed teeth before they have passed the morning of life. On the other hand, those nations who do not change the proportions of the mineral constituents in their food, do not lose their teeth from decay. This fact is well established by various writers upon the physical history of man, in different parts of the world, and is a recognized principle of physiology; and yet, as a nation, we are regardless of the consequences, and sacrifice many millions of teeth annually. This national calamity can be prevented to a great extent by simply popularizing a change of fashion. Let the bread of this nation be made from unbolted flour. Let us cease to change the fixed standard of proportions in the constituents from which the teeth are made, and then we may expect these organs to be well formed, and to last as long as the other parts of the system. If this love of fashion has too strong a hold upon the public mind to do this, let parents who regard the welfare of their children ponder well this subject, and decide which is best for their little ones—fine flour or fine teeth.

(Written for *The Journal of Education*.)

**The Old Towers of the "Fort des Messieurs."**

(By MAS. LEPROHON.)

On the eastern slope of Mount Royal's side,  
In view of St. Lawrence' silvery tide,  
Are two stone towers of masonry rude  
With massive doors of time-darkened wood;  
Traces of loop-holes still show in the walls  
Whilst softly across them the sun light falls;  
Around, stretch broad meadows, quiet and green  
Where cattle graze—a fair, tranquil scene.

Those old towers tell of a time long past  
When the red man roamed o'er these regions vast,  
And the settlers—men of bold heart and brow,  
Had to use the sword as well as the plough;  
When women, no lovelier now than then,  
Had to do the deeds of undaunted men,  
And had higher aims for each true warm heart  
Than study of fashions or toilet's art.

A brave, hardy race from beyond the sea,  
Were those ancient founders of Ville Marie!  
Treacherous Sioux and Iroquois bold,  
Hung round their homes like wolves round the fold,  
Yet they sought their rest free from coward fears,  
Though war-whoops might sudden sound in their ears;  
Or battle's red light their slumbers dispel,—  
They knew God could guard and protect them well.

Look we back nigh two hundred years ago,  
Softly our river's bright waters past flow,  
Streams the glad sunshine on each purple hill,  
Rougemont, St. Hilary, Boucherville,  
Kissing the fairy like Isle of St. Pauls  
Where so hushed and holy the twilight falls;  
Or, far St. Helen's, mid the green wave's spray,  
All lovely and calm as it is to-day.

No villas with porticos handsome, wide,  
Then dotted our queenly mountain's side,  
No busy and populous city nigh,  
Raised steeples and domes to the clear blue sky;  
Uncleared, unsettled, our forests hoar,  
Unbridged our proud river, quiet each shore,  
Whilst over the waves of emerald hue,  
Glided lightly the Indian's bark canoe.

It was in those towers—the southern one—  
Sister Margaret Bourgeoys, that sainted nun  
Sat patiently teaching, day after day,  
How to find to Jesus the blesséd way,  
Mid the daughters swarth of the forest dell,  
Who first from her of a God heard tell;  
And learned the virtues that woman should grace,  
Whatever, might be her rank or her race.

Here too in the chapel tower buried deep,  
An Indian *brave* and his grand-child sleep, (1)  
True model of womanly virtues—she—  
Acquired at Margaret Bourgeoys' knee;  
He, won unto Christ from his own dark creed,  
From the trammels fierce of his childhood freed,  
Lowly humbled his savage Huron pride  
And amid the pale-faces lived and died.

With each added year grows our city fair;  
Churches rich, lofty, and spacious square,  
Villas and mansions of stately pride,  
Embellish it now on every side;  
Buildings—old landmarks—vanish each day,  
For stately successors to quick make way;  
But we pray from change time may long leave free  
The ancient towers of Ville Marie!

(1) Subjoined are their epitaphs, still to be seen in the tower we speak of.

Ici reposent

Les restes mortels

de

FRANCOIS THORONHONGO,

Huron,

Baptisé par le Révérend

Père Brébeuf.

Il fut, par sa piété et par sa probité, l'exemple des chrétiens et l'admiration des infidèles; il mourut âgé d'environ 100 ans, le 21 avril 1690.

Ici reposent

Les restes mortels

de

MARIE-THÉRÈSE GANNENSAOOUAS

de la

Congrégation de Notre-Dame.

Après avoir exercé pendant treize ans l'office de Maitresse d'école à la Montagne, elle mourut en réputation de grande vertu, âgée de 28 ans, le 25 novembre 1695.

### Style.

Few things more mark the criticism of our day than the praises lavished upon Style; few things more mark the attitude of the great reading class than the stolidity with which such eulogies are heard. Nor need we go far to find an explanation. In our time, with its host of distractions from serious study, and its crowd of prints that must be skimmed by all who would not be thought contemptibly ignorant, style is swiftly gathering a new utilitarian value. Style means such an arrangement of words as shall make the author's meaning rise up in the logical order of the ideas, and thus save the reader all needless toil; such a choice of phrase, and balance of clause, and structural grace of sentence as shall satisfy the sense of beauty; such a propriety, economy, and harmony of expression as shall tell the reader exactly what the writer means, tell it with a business-like brevity and an artistic beauty. All these qualities characterize style of the highest order. Style is, therefore, an artistic expedient to make reading easy, and to perpetuate the life of written thought. Of all the badly-written books bequeathed by past generations, none have lived but those of transcendent intellectual merit or those to which a supreme historical value is lent by their pictures of vanished days; whereas writing of the secondary intellectual rank may be kept green by the vitality of its artistic workmanship. Indeed, works of second rate value in point of thought or archaeological interest are inevitably doomed to a speedy death unless they bear such a passport to futurity as a first-rate style. France saw that fact long before England. Partly because the French mind has a keener perception than the English of the Greek-like simplicity and directness which belong to the highest artistic beauty; partly because the French language falls more easily than the English into symmetrical moulds; and partly because the French Academy has acted as a literary police for the suppression of verbal license, France can still teach England the academic graces of style with as much authority as Greece taught rhetoric to Rome. While our greatest writers were still pouring forth their thoughts with inartistic skill, or were rising to perfect beauty of statement only when possessed with that fierce heat of passion which gives to rhetoric an arrowy directness and a rhythmical flow, France had already achieved a classic propriety of Style. As an artistic product, Pascal's rhetoric is better than that of any English contemporary; so is that of Bossuet, Voltaire, and Courier. Even in the present enfeebled stage of French literature, no Englishman writes with Renan's incomparable academic beauty, nor in the lower rank of journalism, can the best foreign rhetoric match the elegance of Prevost-Paradol's somewhat feeble disquisitions. But although the art of rhetoric has still to be taught in England with such rigour as it is taught in France, it is long since our men of letters saw the supreme value of artistic expression, and those of the present day has reached an unexampled stage of academic elegance. In rhetorical excellence, Landor, De Quincey, John Henry Newman, Macaulay, Froude, Goldwin Smith, and the crowd of nameless men who address the public from hour to hour, stand each in his way far above the past writers of corresponding power. We are now casting the English language into finer moulds. We are amassing new and more subtle canons of style. The landmarks of good rhetoric are every day becoming more abundant and more certain, so that the old pitfalls are no longer perilous even to feeble feet.

The value of style as an instrument for winning the attention of the public, for saving the reader all needless labour, and for keeping a hold on the grateful memory, explain why writers who are deemed masters of language wring constant and feverish eulogy from their fellow-workmen. But, as we have already said, those eulogies find a feeble echo in the public mind; and men whose writing is proclaimed to be a marvel of literary art are often read only by the cultivated class. It is easy to see why the professional man of letters should be thus eager with his praises. Since he is keenly alive to the difficulty of writing perfect English, he instinctively looks for technical triumphs of expression, and he attributes a value to style for its own sake. Unconsciously, he is prone to set most store by that writing which gives himself the best lessons in rhetoric, and he finds what he seeks in the style which obtrudes itself by its very brilliancy, or by the completeness of its triumph over the difficulties that beset his own pen. In such a style the art is always more or less vividly revealed. It is so vividly revealed that we can mark the process of the worker and study his devices, with almost as much ease, and as much profit, as an engineer can draw the details of a new and curious machine. On the other hand, such art must be second-rate. In literature, in painting, or in music, the highest art hides the hand of the workman under a thick veil. A literary artist of the second rank, like Macaulay, makes constant use of devices which are obviously mechanical and which can be learnt; a writer of the first order, even if he do not stand in the foremost place of that hierarchy, such as Heine, is

constantly inventing new forms, which seem to evaporate in the act of analysis. The one might be compared to a skilled artisan, who, after cutting a limited number of dies, employs them again and again, so that the student can readily copy the figures, and use them in much the same fashion as the artist himself; the other seems like an artist with so rich an invention that he never takes two impressions from the same die, but breaks up each design the instant that he has struck it into wax, and then cuts another into form. While art of the second rank is thin and easily dissected, art of the first rank is the product of subtle organisation, like human life itself. The thinking of Shakespeare's characters, for example, is characterized by all that subtle, rich, confused play of motive, device, and reason which we detect in the workings of our own mind; it is many-tinted; it is full of labyrinthine folds; it unveils by glimpses the unexplored unfathomable abysses of the soul. The rhetoric which can express the profundity and the comprehensiveness of a passion like Lear's, can be confined within the limits of no academic rules, and creates a rhetoric of its own.—*Spectator*.

### Judgment in Reading.

It is not those who read most who acquire most knowledge, any more than it is those who eat the most grow the most obese. Digestion has a great deal to do in both cases. Excessive reading is as bad a habit as excessive eating. If one overloads the stomach, the other overloads and stupefies the mind, and renders it incapable of retaining what it has received. The mind cannot properly dispose of a mass of reading on various subjects hastily crammed into it. The knowledge which is merely received by the mind vanishes like a dream; but elaborated, appropriated and assimilated by reflection, becomes a part of the intellectual, as food becomes tissue in the physical, man. Many persons who read hastily and read a great deal, wonder that they forget so much, and charge the fault to a failing memory. But the memory is not to blame. The trouble is, they cram knowledge into their minds faster than their minds can appropriate it, and the abused memory is bound, in self-defence, to disgorge the whole load. It is this class of readers who boast of ability to "get through" an elaborate novel from the pen of a first-rate author in a single day. But the truth is, they had better not read at all than read in this way. They perceive no more of the beauties of the book than a so-called tourist, who walks into the Louvre at one door and out at the other, perceives of the spirit of the marvellous pictures and statues that adorn its galleries—or than the weary traveller perceives of the details of a picturesque landscape through which he has been shot by the express train at forty miles an hour. But besides doing no good, hasty, promiscuous reading does a great deal of harm. It is a vice. It debauches the mind. It blunts its powers, impairs its receptivity and denies to it the healthful vigor and acumen which systematic, reflection imparts. It renders it callous, and incapable of receiving and retaining impressions. There ought to be judgment and system in reading as well as in business or labor. It must be attended by meditation. Two hours a week devoted to deliberate and careful reading will give more real knowledge than three hours a day of the "skimming over" which is so universal a habit with young people.

### Remarks on the Progress of Astronomy in 1869.

BY W. T. LYNN, B.A., F.R.A.S.,

(Of the Royal Observatory, Greenwich.)

THE SUN.—We have more than once had occasion to refer to the extension of our knowledge of solar physics which has recently been achieved, principally by the use of the spectroscope. Those curious phenomena, known as red flames, or rose-coloured protuberances, which had been seen during a total solar eclipse on the circumference of the Sun's disc, either in actual contact with it, sometimes along a very considerable arc, or occasionally quite detached from it and separated by a short distance, were for a long time an enigma to astronomers. After the eclipse of 1860 had definitely decided that they were strictly solar phenomena, the interest felt in them was greatly increased, since it was perceived that their study might throw light upon the constitution of the Sun itself. On the occasion, then, of the great total eclipse of August, 1868, expeditions were fitted out by several European nations, and every effort was made by astronomers to avail themselves especially of the new means of observation and research of which they had become possessed, to acquire a complete solution of this interesting mystery.

These endeavours were crowned with success, and the spectra given by the prominences (as they are now usually called) clearly showed that they consisted of great masses of gaseous matter, chiefly hydrogen, which were carried by upward currents to immense heights above the rest of the solar surface. M. Janssen, who observed the eclipse in Hindostan, conceived the idea of directing the spectroscopic telescope to the Sun's limb when there was no eclipse, and thus detecting the existence of the prominences and studying their contour at a time when they could be studied at leisure and free from hurry and excitement. This he succeeded in doing the very next morning after the eclipse, and thus satisfactorily established the fact that the principal constituent of those appearances was incandescent hydrogen gas, in enormous masses, and constantly undergoing movements of a most violent and tumultuous kind. Not long after this observation, and quite independently of it, our countryman, Mr. Lockyer, also succeeded in seeing the spectra of the prominences without an eclipse, and by the careful use of a new spectroscopic, specially adapted to the purpose, was enabled to discover that the so-called protuberances, or prominences, were nothing more than local heapings-up of incandescent gas, which completely surrounded the Sun as an exterior envelope, to which he gave the name of the chromosphere. The continuous study of the prominent parts of this envelope, now that the possibility of doing so at any time has been manifested, has not failed to be diligently taken up during the year 1869, and has thus made us more familiar with many circumstances concerning its nature and extent. In the July number of *THE STUDENT* (vol. iii., p. 441) we referred to Dr. Tietjen's observations of it at Berlin, and in the September number (vol. iv., p. 143) to those of Professor Zollner at Leipzig. The latter especially are remarkable as showing the great height to which parts of the envelope extend themselves, and the great and rapid changes to which it is subjected, as well as the flickering flame-like motion which was seen by him on the occasion of the upward rush of great masses of the hydrogen, of which it appears to be principally composed. Professor Brayley has more than once in the *Monthly Notices of the Royal Astronomical Society* pointed out the probability that these prominences and the faculæ are in fact the same phenomenon seen, in the former case, outside, and, in the latter case, in front of the Sun's disc. It has indeed been objected to this that the faculæ are never seen excepting within a certain distance of the Sun's equator; but this may perhaps be accounted for by their position, when near his poles, interfering with their visibility.

Another phenomenon which is seen in central eclipses of the Sun has excited, and deservedly so a considerable amount of interest—we refer to the so-called corona. Whether it is a solar, lunar, or terrestrial (atmospheric) appearance, has not yet been satisfactorily decided. It was thought that its light had been proved to be polarized, but Professor Pickering made some observations during the total eclipse of last August in America, which seem to show that even this cannot be considered as a definitively established fact. The spectroscopic observations of the corona showed a continuous spectrum, both on that occasion and on that of the Indian total eclipse of 1868; but in 1869 bright lines were seen in it which had not been perceived the year before, and one at least, if not all three of these, coincided with those of the Aurora Borealis. Mr. Baxendell's suggestion of the corona being due to a nebulous ring round the Sun (the existence of which he had shown by different considerations) reflecting the solar light, appears to call for further investigation. There is apparently no reason why this nebulous ring should not contain both luminous and non-luminous matter.

**THE PLANETS.**—Some interesting planetary observations have been made during the year 1869. In particular, the knowledge which has been accumulated regarding the planet Mars which, from its position and circumstances, offers more favourable conditions for accurate scrutiny and examination than any other, has been embodied by Mr. Browning in four stereograms, representing pretty closely the aspect of the whole of that body when best seen with really good telescopes. Mr. Proctor has carefully mapped out the surface of the planet, which, unlike our Earth, appears to contain a much larger proportion of land than water, and to be circumstanced, geologically or areologically, somewhat differently. He has also made a more accurate determination of the time of rotation of Mars than had previously been obtained, amounting to 24h. 37m. 22.735s.

Mr. Slack and Mr. Browning have both noticed a remarkable change of colour in the recent appearance of Jupiter's belts. We have been informed by Mr. Prince, of Uckfield, that this curious phenomenon, which certainly seems to suggest some "violent and peculiar action," has also been noticed by him.

Only two small planets have been added to the list during the past year. Hecuba was discovered by Dr. Luther, at Bilk, on April 2, and No. 109, as yet unnamed, by Professor C. H. F. Peters, at Hamilton College, on October 9.

**THE MOON.**—In mentioning the Moon, our nearest neighbour, we have not space to say much, but cannot omit to refer to Mr. Birt's zealous efforts to obtain an accurate knowledge of at least some particular regions on her surface. The detailed information he has been able to furnish of that interesting tract, the Mare Serenitatis, and is proceeding to complete of the remarkable object near her north point, known as Plato, will give us, by comparing them with the appearances seen at some future time, a better hope than we have ever before had, of tracing, if possible, traces of present activity on the Moon's surface.

**COMETS.**—We cannot say that much new physical knowledge has been arrived at concerning comets in the past year. One of the periodical comets has returned, according to prediction, and two new ones have been discovered, but all three are very faint bodies. The periodical one is that known as Winnecke's which was discovered by that able astronomer in the year 1858, and seen by him again (two periods having elapsed between, as the comet could not be observed at the return in 1863) on the 9th of April, 1869. It was afterwards observed by several astronomers, both before and after its perihelion passage, which took place on the 30th of June. The last person who saw it, so far as we are aware, was Herr Vogel, at Leipzig, on the 11th of October.

The two new comets were both discovered by Herr Tempel, at Marseilles, II. 1869 on October 11, and III. 1869 on November 27. Both have parabolic orbits: the former passed its perihelion on the 9th of October (two days before its discovery), at the distance of about 112 millions of miles from the Sun; the latter on the 21st of November (six days before its discovery), at the distance of 100 millions of miles.

**METEORS.**—We have but little to record under the interesting head of meteoric observation. The subject has continued to be well followed up, but not much has been added to our knowledge of the theory of meteoric rings, and their connection with comets. Vigorous watch has been maintained for the known systems, and particularly for the November shooting stars, of which a pretty considerable number was seen at some places, but falling far short of that of the previous year. It would appear, therefore, that the part of the ring passed through by us in 1869 was not an abundant one; nor, indeed, as we had before stated, did we expect that it would be. But it is a curious and remarkable circumstance that the shower, at this part of the ring, appears to consist of two or three distinct branches.

**STARS AND NEBULÆ.**—Stellar observation, as we have already remarked, has been in steady and vigorous action at many observatories, but, excepting some details respecting the visibility and magnitudes of some of the variable stars, establishing more completely than hitherto their periods and the nature of their changes of magnitude, and a few fresh discoveries in that direction, not much of a striking character has come to the surface in 1869. The most interesting investigations in this pre-eminently interesting department of astronomy, have been those of Mr. Proctor on the distribution of the nebulæ as compared with that of the stars, which tend to the conclusion that there is some closer connection than had been formerly supposed between these two classes of bodies, and that many of the nebulæ are no further distant from us than the stars. This remark probably does not apply to them all, and there is reason to believe that the spiral nebulæ in particular are bodies or collections of matter *sui generis*. Mr. Proctor's labours on this subject are worthy of the closest attention; they have been, however, so well set forth by himself in former numbers of *THE STUDENT*, under the title of "A New Theory of the Universe," that we may be excused from entering into them with any detail, though in a sketch, however imperfect, of the history of astronomy in 1869, it was out of the question to omit all mention of them. That gentleman also communicated to the December meeting of the Royal Astronomical Society an interesting paper on the conformation of the Milky Way, the result of which will probably command the assent of astronomers, but to which, in our present rapid survey, we must content ourselves with a bare reference.—*The Student.*

### The Cuttle-Fish.

Mr. L. L. HARTT, in his "Chapters on Cuttle-Fishes," describes his encounter with one of these octopods on the coast of Brazil, which wound its long arms, covered with numerous suckers, around his hands in such a way as to hold him prisoner for a short time. On relinquishing its hold it dropped on the sand, and, using its long, slimy arms as legs, made its way towards the water, looking like a huge and very tipsy spider. The cuttle-fish belongs to the mollusks, a branch of the animal kingdom distinguished for its members being built upon the plan of a sac, and to which Mr. Hyatt has applied the more appropriate name of *Saccata*. It is distinguished from all other



mollusks, such as snails, clams, &c., by having a very large head, a pair of large eyes, and a mouth furnished with a pair of jaws, around which are arranged, in a circle, eight or ten arms furnished with suckers. In the common cuttle-fish or squid of our coast, the body, which is long and narrow, is wrapped in a muscular cloak or mantle, like a bag, fitting tightly to the back, but loose in front. It is closed up to the neck, where it is open like a loosely-fitting over-coat buttoned up to the throat. Attached to its throat, by the middle, is a short tube, open at both ends. The tube or siphon can be moved about in any direction. The animal breathes by means of gills, which are attached to the front of the body, inside the cloak, and look like the ruffles of a shirt-bosom. By means of these gills the air contained in the water is breathed, and they answer the same purpose for the cuttle-fish that our lungs do for us. In order to swim, the animal swells out the cloak in front, so that the water flows in between it and the body. Then it closes the cloak tightly about the neck, so that the only way the water can get out is through the siphon. Then it contracts forcibly its coat, and the water is driven out in a jet from the siphon, and the body is propelled in an opposite direction like a rocket through the water. This siphon is flexible, like a water-hose, and can be bent so as to direct the stream not only forward, but sideways, and backward, so that the animal can move in almost any direction, and turn summersaults with perfect ease; and so rapidly do some cuttle-fishes swim, that they are able to make long leaps out of the water. Usually, however, the animal swims backward, with its long arms trailing behind. Our common cuttle-fish of this coast has, in addition to its eight arms, two long slender tentacles, which may be withdrawn into the body. The tail is pointed, and furnished with a fin on each side. The octopods, to which the Brazilian cuttle-fish belongs, have round purse-like bodies, and eight arms united at the base with a web, and they swim by opening and shutting their arms like an umbrella; in this mode of swimming they resemble the jelly fishes. The paper nautilus is nothing in the world but a female cuttle-fish that builds a shell. There was a very pretty story told of her habits by Aristotle, the old Greek naturalist, which every body believed until quite lately. He said she rode on the top of the waves, seated in her boat-like shell, and spreading her broad arms to the winds for sails. But, unfortunately, the story has no foundation in fact. She either crawls about on the bottom of the sea, or swims quite like other cuttle-fish, shell foremost, only occasionally coming to the surface. Strangely enough, she holds the two broad hand-like extremities of the arms against her body, and it is the inside of these arms that secrete the paper-like shell, which is only a sort of cradle for her eggs. Not so with the pearly nautilus, which is furnished with a beautiful coiled-up pearly shell, formed on the outside of the animal. The shell is divided into numerous chambers, and the animal, living in the outer one, builds a partition across the back part of it as the shell grows. Cuttle-fish are sometimes used for food by the Brazilians, and different species may be seen in the markets, where one frequently finds them still alive. Sometimes as we stoop to examine one, its body is suddenly suffused with a deep pinkish glow. Before we have time to recover our surprise this colour fades, and a beautiful blue takes its place as rapidly as a blush sometimes suffuses a delicate cheek. The blue, perhaps, is succeeded by a green, and then the whole body becomes pink again. One can hardly conceive anything more beautiful than this rapid play of colours, which is produced by the successive distension of sets of little sacs containing fluids of different colours which are situated under the skin. The cuttle-fish is also furnished with a bag containing an inky fluid, which when the animal is attacked or pursued, it ejects into the water, thus completely blinding its adversary and effectually covering its retreat. It is from this fluid that the colour sepia is made. Besides carrying an ink-bottle some species of cuttle-fish are provided with a long, delicate, horny pen, which forms a sort of stiffener to the back. In some species the pen is hard, thick, and broad, and the cuttle-fish bone of commerce is of this kind. The species found in our waters is very small, and not at all dangerous, being barely large enough to draw blood from the hand; but in the tropical seas they are very large, powerful, and dangerous. The cuttle-fish is the original of Victor Hugo's devil-fish, so vividly described in the "Toilers of the Sea." If the devil-fish were a beneficent one, Mr. Hartt says he should be sorry to destroy our faith in it; but as it is, he believes it will be rather a relief than otherwise to know that in some important respects Victor Hugo's story of it is a fable. The Kraken was a mythical cuttle-fish of fabulous size.—*American Naturalist*.

### The Moon.

To produce a volcano, water is required. By the slow escape of the central heat of our globe, the interior parts cool and contract. The crust of the earth, left without sufficient support, cracks and subsides. The shock is propagated through the earth, and an earthquake is produced. Often water penetrates, and in the form of steam at high pressure drives up the molten rocks before it, and a volcano is produced. No water can be detected on the surface of the moon; where, then, is the water that produced the volcanoes we see there? Some have suggested that the solid part of the moon is pear-shaped, with the stalk end as it were towards us; whilst the water has all accumulated on the flattened end of the pear, and so is invisible to us. Such a supposition, however, appears extremely gratuitous, and besides is unnecessary. If any of Jupiter's or Saturn's satellites were so constituted, the part furthest from Saturn or Jupiter would be less bright than the rest of their surfaces; but though their surfaces do vary in brightness in different parts, the dimmer part in no case, we believe, is that which is furthest from their primaries. So there is no analogy in favour of this idea. The solution of the difficulty arises from the different bulks of the earth and moon. The weight of bodies on the moon is less than one-sixth of what it would be on the earth. Now, we know that the sun is composed largely of elements such as exist on our globe; nay, further, remote fixed stars are so also. We have thus every reason to believe that the materials of the moon will not differ much from those of the earth. As the interior of the earth cools down and contracts, the weight of the outer crust which, if strong enough, would be left as a shell, breaks it down, and crushes it into the contracted matter below, so that no cavities, or comparatively small ones, are left. But in the moon the shell covering a cavity would be of smaller radius, the moon's radius being less than that of the earth, and consequently stronger. Above all, the weight of the materials composing it being less than a sixth of the weight of the materials of the earth's crust, but as strong, owing to the feebler force to crush the crust down, cavities would be formed on a far larger scale than could exist in the earth. Imagine, then, the earth and moon at equal temperatures. They cool down—the moon, however, being the smaller, the more rapidly. The thin crusts at first formed on each are crushed down on the central mass as it contracts. After a while, when the crusts have acquired some thickness, the lunar crust becomes thick enough to withstand the crushing for awhile, and cavities are formed. When the break-up takes place at last, the lunar oceans penetrate, and pouring in immense quantity into the large cavities, meet the still hot mass below, and a tremendous volcanic outburst is the result. When we remember that the power of the pent-up steam would be as great as on the earth, but the rocks and lava to be thrown up would weigh less than one-sixth, we can easily understand the vast craters which exist on the moon, so thickly in places as to suggest the idea of the surface having been blown up in bubbles. As the cooling process continues, other and larger cavities are formed, the weight of the superincumbent crust being too little to crush it down into them. Into these ultimately the oceans descend, and after them the atmosphere. We thus see how, by the cooling down of the moon, vast internal cavities have been formed, in which her ocean and atmosphere are now buried. The atmosphere that still clings to the moon is but the thin upper layer; the rest has long since disappeared. The rates of cooling down of the earth and moon are inversely proportional to their diameters, or as three to eleven. The disproportion between these is nothing so great as that between the times of their stopping each other's rotations. We can thus see why it is that, whilst ages ago, the moon has ceased to rotate independently of us, she still continues to show some signs of central heat in the few cases of volcanic outbursts that have been observed.—*Chambers' Journal*.

### The Rosse Telescope Set to New Work.

Lord Rosse has even been able to form an estimate of the relative amount of heat we receive from the moon and from the sun. He states, as the result of his observations, that the radiation from the moon is about the 900,000th part of that from the sun. But perhaps the most interesting result of the inquiry is the determination of the actual heat of the moon's surface at the time of full moon, or rather at lunar mid-day. By comparing the heat received from the moon with that derived from certain terrestrial sources of heat, Lord Rosse finds that the moon's surface must be heated to a temperature of about 500° Fahrenheit, or nearly 300° above the boiling point! Nor is this result, startling as it seems at first sight, to be greatly wondered at, when we remember the circumstances under which the moon's surface is exposed to the solar rays. Fancy a day a fortnight long; not as in our polar regions, with a sun only a few degrees above the

horizon even at mid day, but with an almost vertical sun for several days in succession. We know the intensity of the heat which prevails at noon in tropical countries, but that heat is a mere nothing compared with that which must prevail when, instead of a few hours, the sun hangs for five or six days close to the zenith, and pours down his rays on a surface unshielded by any atmosphere. And with respect to the effects of an atmosphere, let us not be misunderstood. It is well known that the intense heat of the tropical climate is not tempered, but increased, by the density of the atmosphere. On the Himalayan slopes, several thousand feet above the level of the sea, an endurable if not a pleasant climate can be found, because of the rarity of the air. But the direct rays of the sun are hotter—paradoxical as it may sound—on the snow-covered summits of the Himalayas than at the sea level. Those who have travelled over snow-covered mountains in summer know well that, while the air may be cool and refreshing, the sun will be peeling the skin from hands and face incautiously exposed to his rays. Thus it is, doubtless, on the moon's surface, except that all the effects of the sun's heat are intensified, through the tremendous length of the lunar day and the absolute absence of any lunar atmosphere. Indeed, Sir John Herschel, from theoretical considerations, was long since led to anticipate the results of Lord Rosse's researches. He remarked that "the surface of the full moon exposed to us must necessarily be very much heated, possibly to a degree much exceeding that of boiling water." The question of the moon's habitability by such creatures as subsist upon the earth is, of course, finally disposed of by Lord Rosse's discovery. We could not live conveniently at the temperature of boiling water, nor could any beings we know of. The famous salamander, even if it had all the properties assigned to it in olden times, instead of being one of the most cold-living of all known creatures, would find the moon an unsatisfactory residence. For tremendous as is the heat of the lunar mid-day, the cold of the lunar night must be still more terrible. It has been well remarked by Tyndall, that were it not for the moisture with which our atmosphere is laden, the cold of a single night would bind our fields in a Siberian frost. Imagine, then, the effects of a night of three hundred hours in a region where there is neither moisture to form protecting envelopes of cloud or mist, nor an atmosphere to support such envelopes even if they could be formed. Doubtless the cold of the lunar night is of an intensity such as not even the most ingenious appliances of our chemists could produce. Under its influence not merely would all known liquids be frozen, but probably every gas known to us would be converted into the solid form.—*Fraser's Magazine.*

### On a New Technical Application of Colors.

Metallic leaves and membranes, made iridescent by the method to be described, may be employed advantageously for decorating articles of paper, parchment, leather, and fabrics of all kinds, especially laces and ribbons; moreover they may be used for dresses, portfolios, *étuis*, articles of Bristol-board, tapestry, note-paper, and many other objects of ornament and luxury. They may also be employed in typography and calligraphy, for representation of natural objects, as butterflies, birds, shells, and other creatures having metallic lustre. The coloration of metallic leaves is effected in the following manner: A leaf of part gold is laid on the bottom of a box two by twelve inches in size, with the gilded side upward. This box is provided with a cover in which is inserted a glass four square inches in size. In order to produce the coloration, the cover is moistened upon its inner surface with a very dilute solution of sulphide of ammonium—ten drops to one ounce of water; the box is then closed, and after six hours the moistening is repeated with a concentrated solution of the sulphide until the desired color has made its appearance. The beauty of the coloration depends greatly upon the slow and uniform action of the sulphuretted hydrogen. Deep and bright shades may be obtained at will. For ordinary articles common gold-leaf may be employed; and, in addition, a great variety of shades may be obtained by using thin leaves of different alloys. These are afterward assorted according to their shades, and laid between the pages of a book provided for that purpose. To apply them to articles of leather, liquid albumen is used as in gilding; and where textile fabrics form the basis, dried albumen in powder is employed. The latter is printed on by means of slightly warmed printers' rollers, plates or stamps. The parts of pictures and calligraphic productions that are to be decorated are brushed over with gum arabic, the leaves are then slightly pressed on with cotton, and when dry, non-adhering particles are removed by means of a velvet brush. For iridescent membranes a mixture of eight parts of collodion and one of oil of lavender is used. This is allowed to evaporate in a wide vessel to the consistency of a sirup; and, as freshly prepared solutions do not yield in the membranous

state the same vivacity of prismatic colors produced by those that are not used directly, they are allowed to remain quiet for several days. The solution is then allowed to flow in drops into a plate containing water; the drops will spread out, forming membranes, exhibiting the most beautiful colors of the rainbow. These must be taken up with a wire ring, about five inches in diameter; after this, they are hung up to dry. The folia thus obtained may be applied to the inlaying of fancy articles, to braids, laces, etc., or they may be used for pinkings of paper, leather, horn, ivory, and wood, as well as for watch-cases, fans, bouquet-holders, collars, cuffs, playing-cards, cartes de visite, photographs, book-covers, and albums. To all these articles their lively iridescence imparts a most beautiful appearance. Objects of leather, paper, etc., are perforated by means of deeply-cut steel matrices dusted with amianthus powder. Articles of wood, horn, ivory, and tortoise-shell are sawn out after a given design.

The iridescent membranes to be employed may also be provided with a reflecting and radiating surface, which is produced by dissolving one part of sugar of lead in thirty parts of water, filtering this solution into a round tin vessel seven inches in diameter and one inch in depth. Over this a glass funnel of a larger diameter is placed, and connected by means of an india-rubber tube with a bottle, in which sulphuretted hydrogen is generated. When this gas comes in contact with the lead solution, a chemical reaction takes place, the result of which is a thin film of metallic lustre. Such films can also be obtained by holding a Bristol-board moistened with sulphide of ammonium over the lead solution.

Other films may be produced by passing a current of phosphuretted hydrogen over a solution of nitrate of silver or chloride of gold, these gases being prepared according to the methods described in every text-book of chemistry. When the films have assumed their highest brilliancy, the generating apparatus is closed and the funnel removed. They are then carefully laid upon the metal leaves, and dried with them. They form excellent imitations of nacre, (mother of pearl.) As to the reflecting gold and silver leaves, they are capable of more valuable applications, as in the case of silk and velvet, where the highest order of perfection may be desired. The best adhesive materials are mixtures of copal varnish and white lead, indigo, or lamp-black; by means of printers' balls these are spread uniformly upon wooden types, which are used to print with. The colored membranes are then slightly pressed upon the printed parts by means of cotton. When perfectly dry, the non-adhering particles are removed by means of a brush. The print thus produced exhibits the most magnificent colors of colibris, dark nacre, and the opal and labrador. Goblets, plates, and vases of glass, when so blown that each article consists of two parts, fitting into each other, and leaving an intervening space of the width of thick paper, may also be made opalescent. To this end, one of the parts is coated over with a clear solution of albumen by means of a large and fine brush, then dried in a warm atmosphere, and afterwards coated with a dilute solution of silver or gold. It is then placed under a bell jar, into which phosphuretted hydrogen is conducted, until all sides are uniformly coated. Then the object is dried. After the manipulation it is coated with a collodion membrane, as described above. When dry, the cups are set into each other, and made to hold together by means of a gold or silver strip. Such vessels present a magnificent iridescence, sometimes rivalling the antique opal and labrador vases of Herculaneum and Pompeii.—*Manufacturer and Builder.*

## OFFICIAL NOTICES.

### Regulations of the Council of Public Instruction and Text Books Approved.

By an Order in Council, dated January 28th, 1870, the Lieutenant Governor was pleased to approve of the following Resolutions passed by the Council of Public Instruction at its meetings held on the 20th and 21st of October last.

"Resolved, that this Council confirms and approves in their form and tenor all the resolutions and regulations adopted by the Council of Public Instruction previously to its reorganization, with the exception of the regulation concerning the approval of books, which is also confirmed and approved with the following modifications:

"10. In future, the books submitted for the approval of the Council shall be referred simultaneously to the Catholic Committee and to the Protestant Committee.

" 20. If their approval be recommended by the two Committees, they shall be approved by the Council, and it shall be stated in the notice that shall be given that they have been approved, on the recommendation of the two Committees, for Catholic Schools and for Protestant Schools.

" 30. If their approval be recommended by only one of the two Committees, they shall in like manner be approved by the Council, excepting that mention shall be made of their approval on the recommendation of the Catholic Committee or of the Protestant Committee, only, for Catholic Schools or Protestant Schools, as the case may be.

" 40. Persons desirous of procuring the approval of books by the Council must transmit to the Council before hand twelve copies in place of eight.

" Resolved that on the recommendation of the two Committees, the following books be approved for Catholic Schools and for Protestant Schools :

" *Dr. Mile's Series of History of Canada*, entitled

10. *A New History of Canada, 1534-1867*, to serve as a general reader in the Secondary or Superior Institutions.

20. *A School History of Canada*, prepared for the Elementary and Model Schools.

30. *The Child's History of Canada*, for the Elementary Schools.

" *Eléments de Botanique et de Physiologie végétale* suivis d'une petite flore simple et facile de la Province de Québec, par M. l'Abbé Ovide Brunet.

" *Histoire du Canada, à l'usage des maisons d'éducation*, par le Rév. C. H. Laverdière, A. M."

#### DIPLOMAS GRANTED BY BOARDS OF EXAMINERS. (1)

##### SHERBROOKE BOARD.

Session of February 1st, 1870.

ACADEMY DIPLOMA, (E) 1st Class :—Miss Katharine David Gibb and Mr. Willard A. Smith.

MODEL SCHOOL DIPLOMA, (E) 1st Class :—Miss Elisabeth Low.

ELEMENTARY SCHOOL DIPLOMA, (E) 1st Class :—Misses Lizzie J. Fish Adaline A. Wilcox, Alma Wilson and Jennie Young.

2nd Class :—Misses Phebe A. Lothrop, Annie McCrea and Arthémise Lapoint. (F.)

S. A. HURD,  
Secretary.

##### QUEBEC (CATHOLIC) BOARD.

Session of February 1st, 1870.

ACADEMY DIPLOMA (F.) 1st Class :—M. Louis François Tardif.

ELEMENTARY SCHOOL DIPLOMA, 2nd Class :—Misses M. Elizabeth Gagné, (F.) and Flora A. McDonald (E.)

N. LACASSE,  
Secretary.

(1) The Editors do not hold themselves responsible for the *orthography* of some of the names of candidates returned by Secretaries as having obtained Diplomas.

## THE JOURNAL OF EDUCATION.

QUEBEC, PROVINCE OF QUEBEC, FEBRUARY, 1870.

### Business Hints for the New Year!

Believing that the maxims and advice contained in the following article in the *Trade Review*, apply with no less force to Teachers than to business men, we have reproduced it (slightly condensed) in our editorial columns, and leave it to the Teachers themselves to make the application.

" The beginning of a new year—the commencement of a new link in the chain of Time—has always been deemed a favourable season to survey the past, take reckoning of the present, and form resolutions for the future. This practice is one which it would be well for the man of business to follow. It is one, the wisdom of which would soon unfold itself. A few hours of reflection—if he would only stop to think—might show him why he has been unsuccessful in the past, or where there is danger of wrecking in the future. One of the great defects of this age, if we are to believe the sage Tom Carlyle,

is the neglect of quiet, earnest *Thinking*. Everybody in general, and the devotees of commerce in particular, appear to have no time to think, and many of them are whirled along in their business career like driftwood on the river's bosom, to fortune or to ruin. With such individuals, let 1870 be an exception. Let them pause, take the bearings of their position, and if success has not perched heretofore upon their business banner, let them adopt and act upon those maxims which *will* bring different results.

In throwing out a few business hints, we lay no particular claim to originality. But truth is none the less important because it is not new, and so many simple maxims which have often been repeated, are the "open sesame" to business success, although they are so familiar to many, that they forget their value, and cease to practise them.

Travellers like Dr. Livingstone, whilst wending their way through solitudes never previously trodden by the foot of civilized man, every short period halt and take reckonings as to where they are. This is precisely what hundreds of business men throughout Canada require to do at the present moment. Not, of course, by the position of the stars, like the great African explorer, but by a strict and searching investigation into the real state of their affairs. It is a lamentable fact, that there are many *who are afraid* to make such an examination—who have not courage to look their difficulties in the face. In nine cases out of ten, after a brief season of uncertainty, and possibly a spasmodic effort when too late, such individuals become bankrupts.

Those persons in business who thus, to use a vulgarism, "go it blind," are not simply foolish—they are criminal. Their negligence is a guilty negligence. Our first advice then is: Take the bearing of your position and ascertain exactly how you stand.

Having faithfully performed the foregoing duty, we can divide the business world into two classes, with propriety,—the successful and the unsuccessful. For each of these, but particularly the latter, we have some advice, and a few seasonable maxims, worthy, we hope, of their consideration,

To the successful merchant, mechanic, manufacturer or trader, we say: Study the causes of your success, and don't let the sun of prosperity blind you to the importance of continuing to cultivate them. Thousands were at one time successful, who have ended their career in failure! This is a well-attested fact, and the causes are not difficult to discover. Reader—are you throwing away past success, by neglecting to give that strict attention to your occupation which formerly characterized you? Are you still as energetic and enterprising as when you commenced? These are pertinent questions and even the most successful may not find it unsalutary to reflect upon them.

Of the unsuccessful in business, we desire first, to ask: Are you fitted for the trade upon which you have entered? The most prolific cause of commercial disaster is, undoubtedly, ignorance of, or want of adaptability for, the particular occupation entered upon. Some people seem to think if they can only get into business no matter what—they are set up for life. Never was there a greater fallacy. How many are there who invest in manufacturing without knowing anything about the business, or allying themselves with those who do? How many think they can "keep store," who know nothing about that calling, and not a few of whom would be much more suitably employed in superintending a— a— horse and cart? How many are there—but we will not multiply instances; it is enough to know, that the bulk of failures arise from this cause, and that no amount of good advice will preserve such from being unsuccessful. In addition to persons not having the necessary business education, there are many who have not sufficient talent—have not the necessary tact and temper—to achieve success, and whose peculiar "idiosyncrasies" so stick out, that they repel instead of attracting public support.

For all these classes who are unsuccessful, there is little hope. The *TRADE REVIEW* New Year's advice to them is "Get out of the "business you are in as soon, and with as little loss as possible, "and turn your attention to what you do understand."

SCHOLASTIC.—We learn from the *Richmond Guardian* that Miss M. M. Bothwell of Durham, has been appointed by the Protestant Board of School Commissioners of Montreal as Head-Mistress in the Royal Western School, and that Miss Josephine Smith of Danville, has received an appointment by the same body, in the Panet Street School.

## Society of Canadian Artists.

(ANNUAL EXHIBITION.)

The Water Colours number upwards of sixty, and are, as a whole, exceedingly creditable to Canadian art. The attention paid to out-door sketching by the most of the artists, as is evidenced by the greater bulk of the specimens exhibited, is one of the most encouraging signs of the future of the Society. Mr. D. Fowler has several contributions. four of still life, "Dead Game" (64' 78), "Dead Saw Bill" (72), "Dead Blue Bill" (80). In landscape his "Beilstein on the Moselle" (67), is badly hung. "High Alps of the Bernese Oberland" (91) "Bridge and Mill, Caernarvonshire" (97), "Ancient Roman Bridge of the Grisons" (100), "Temple of Vesta, Tivoli" (104), and "Bridge on the Pass of the Grimsel, Switzerland" (105) have all more or less a metallic tone in the colours that appears to have been caught up by the artists while painting the changing hues of the game, he is so fond of depicting and in which he so much excels. It is an unpleasant mannerism that detracts greatly from the value of his best works, but no doubt strikes us more from seeing them all together. "Mare and Foal" (101), is a very fine animal study by the same artist. Mr. J. Duncan has three, "View from Peak's Island, Portland" (65), a morning scene, with its cold grey colouring, killed probably by some of the brighter scenes immediately around it. "St. Helen's Island, Montreal," (66) early autumn, the first touch of frost visible, a green vista affording a view of part of Montreal; an attractive picture "View in Montreal—Molson's Brewery," (81) a lively scene on the river bank, the colouring and treatment good. Mr. H. Sandham is working industriously. His "Owl's Head," Memphremagog, (68) is attractive, with its veil or mist round the mountain, out of which the top rises clear. "Twilight," (83) a rushy, reedy spot, that might conceal a murder hole, looks cold and grey in the twilight—a light by the way which is not much enjoyed here. "Landing, St. Helen's Island," (88) is in a different style, and shows some good colouring, but Mr. Sandham should study the changing aspects of water more closely. "Wind and Sun going down" (102) has a fine atmospheric effect. A nautical eye would object to the "tautness" of the sheets which the falling breeze could not cause, and of the boat's painter, which the lazy motion of the barge through the water could scarcely produce. Mr. D. E. Grant shows in all his works extreme conscientiousness of study, a fine eye and a good touch, a little too delicate and finicking, perhaps, and possibly too much inclination for green. He shows "Butternut Creek," (69); "Falls on the Shawinegan River," (76); "On Cap a l'Aigle Road," (89), a very good specimen of his style; "Upper Falls of le Trou," (99); "On the Murray River," (103) the clouds too flat, and like metallic scales; "On the Coast, Murray Bay," (109); "On the Coast after a Gale," (112), one peculiar atmospheric effect and wild sea just going down being very well rendered, and "Falls of le Trou," which is sure to be admired. Mr. Allan Edson has sent several sketches of very considerable merit. "Sketch of Rapids on Shawinegan River," (70), the water too flaky, an exceedingly good "Sketch in the Bush," (75); "On the Missisquoi River," (17), apparently after rain, when distant objects are brought into startling distinctness, "Sand Bars, Shawinegan Bay," (119). Mr. C. J. Way has nine contributions: "View on Lake George," (71); "San Giorgio Maggiore, Venice," (74), a moonlight scene, striking us, however, as too blue in tone; "Near Portland, Maine," (79), sunset of a quiet day, the plashing of the waters on the beach being almost audible; "Between Summer and Autumn," (85), a picture that will gain in favour the more it is looked at; "Rocks and Sea at Sunrise," (87), gives us the peculiar hue of sea and sky at sunrise, and the dashing spray among the rocks, is true to nature; "Short cut up the Hill," (68), has been sold and deservedly so. "The Matterhorn from the Ritter," (10), is a scene of a different kind, the sharp Matterhorn rising, apparently inaccessible to human foot, glaciers with their cold tones and the alpine vegetation all subdued in tone and colour. The sea to the left in "Dirty Weather-breakers ahead," (108), is not such sea as may be seen on a rocky shore like that depicted, it is by no means a favourable specimen of Mr. Way's powers. "At close of Day" (110), shows the chill darkness setting down on the valley at the foot of the hills, whose tops are still flooded with light. The clouds—are not clouds. Mr. Jacobi's "Falls of the Coaticook" (73), is exceedingly good, with its dashing waters, still pool and dark woods, relieved by the lighter foliage in front. "The Falls of the Clyde, Vermont" (84), the only picture exhibited by Mr. J. B. Wilkinson, induces the wish that he had not restricted himself to this only specimen of his powers. The colours are subdued, dark rocks in the fore ground, with high grey rocks to the left, the slender stems of the trees, their roots thrusting themselves into the crevices

and above the dashing and foaming waters, the dark peep under the trees in the back ground, make up a fine picture which will repay examination. Mr. T. M. Martin has a well painted "Dead Duck" (86). Mr. Weston some luscious "Fruit" (96), and "Snow Birds and Pigeons" (106). The same artist sends two views of Quebec, "Morning" (114), and "Evening" (115), and "Montmorency from the Island of Orleans" (116). "Woodland scene" (93), by—Matthews, not striking at first, repays inspection. Mr. Vogts' "Study of a Jog" (96), is spirited, but hung too high. In Mr. R. H. Summerhall's "Scene in St. Lambert's" (118), the red light just fading from the sky, leaves all the foreground in deep shadow almost darkness. Mr. W. Cresswell has five "On the Saugeen" (120), "Gulf of Neiges, White Mountains" (121); "Lake Shore" (122), "Smoke Point, Burlington Bay" (123), a pleasant picture, and "Lake shore" (134), a very good specimen of Mr. Cresswell's style. Mr. F. Shons has a very nice view "On the Beach, Murray Bay" (111), and Mr. W. L. Murray, sends a view "Amongst the Boucherville Islands" (82). The private view was well attended yesterday, and already several of the works have been picked up. It is gratifying to see, what the brief notice will have shown, that the beauties of various parts of Canada have been explored by some of our artists. There are thousands of quiet nooks to be found to be transferred to canvass, miles of sea-beat coast, rugged hills, tranquil streams, and even cultivated scenery, on which the eye of the painter may rest with delight, and which his cultivated taste may teach him how to reproduce for the gratification of the taste for beauty or sublimity of his countrymen. A busy summer in the woods and fields or by the sea, may, it is to be hoped, yield a rich harvest for next year.—*Herald*.

### McGill University.

The Corporation of McGill University have pleasure in acknowledging the following donations to the Faculty of Arts during the quarter ending January 26th, 1870:—

#### I.—TO THE LIBRARY.

- From Peter Redpath, Esq.,—Russell's Modern System of Naval Architecture. Text and plates,—3 vols. fol.
- From the Government of the Dominion of Canada,—Statutes of Canada, 1869. 8vo.
- Do., Sessional Papers, No. 8 to Vol. I., 1867-8. 8vo.
- From the Provincial Government,—Report of the Commissioner of Agriculture and Public Works of the Province of Quebec to Dec. 31st, 1868. English and French. 2 pam. 8vo.
- Do., Journals of the Legislative Assembly of the Province of Quebec. Session 1869. 8vo.
- From the Boston Society of Natural History.—Proceedings. Vol. 12th. 8vo.
- Do., Harris' Entomological Correspondence. 8vo.
- From the Delegates of the Clarendon Press, Oxford, England,—Fowler's Elements of Inductive Logic. 8vo.
- From the Magistrates and Town Council of Paisley,—Memorial of the Inauguration of Fountain Gardens, Paisley. 4to.
- From the Mechanics' Institute,—Catalogue of Books in the Library of the Mechanics' Institute of Montreal. 8vo.

#### II.—TO THE MUSEUM.

- From Mr. D. Nighswander,—Specimen of Astrophyton from Cape Breton.
- From Joseph Bawden, Esq., Kingston, through Prof. Bell,—Specimen of Antlers of Wapiti, from a bog near Kingston.
- From A. R. C. Selwin, Esq., F. G. S., Director of the Geological Survey,—Jaw of *Diprotodon* from Australia.

### Natural History Society of Montreal.

The third monthly meeting of this Association was held at its Rooms on Monday evening, January 31, 1870, the Revd. Dr. De Sola presiding.

Prof. J. W. Marsh, of Pacific College, Forrest Grove, Oregon, was elected a corresponding member.

The following resolutions, having been proposed by Principal Dawson and seconded by Rev. Dr. De Sola, were carried unanimously.

"That this Society, in presenting its medal to Sir W. E. Logan, LL.D., F.R.S., although it cannot add appreciably to the many honours which he has received, desires to place on record, not merely on its own behalf, but on that of all the students of natural science in Canada, its high estimation of the value of his services in creating as well as directing the Geological Survey of this country, in promoting the development of its mineral resources, in stimulating and

aiding the efforts of scientific institutions, and in extending throughout the world the name of Canadian science.

"We desire also to express our high appreciation of Sir William's admirable qualities, and our hope that he may be spared for many years to Canada and to science, and that the relief from official cares may give him the opportunity to pursue to completion the researches in scientific geology in which he is now engaged."

Mr. Billings then read a paper "On the occurrence of the Gastropoda (univalve shells) in the Primordial Zone." He commenced by giving a short account of the discoveries that had been made in other countries, and then exhibited a fossil that had been collected during the last summer by Mr. T. G. Weston, of the Geological Survey, in the Primordial slates, near St. John, in New Brunswick. It was a small species of *ophileta*, and its geological position was several thousand feet below the lowest beds in which any gastropodes had been heretofore found in America. The rocks were of the same age as the Lower Lingula Flags of Wales, and the Menevian group of the late Mr. Salter. Another species, but of a different genus, has been discovered by Mr. Murray, in Newfoundland, in rocks which appear to be primordial, but whose age cannot yet be determined with certainty for want of sufficient fossil evidence.

The Chairman next called upon Professor Bell, of the Geological Survey, to read his paper on the "Intelligence of Animals." The author spoke of the reasoning powers in many of the higher and larger animals as being too well established to require a plea, and devoted much of his paper to instances of what might be regarded as intelligence in such small creatures as insects. He adduced many arguments based on the organization and development of these animals, and more especially on their habits, for regarding them as possessed of something more than mere instinct. It was mentioned, amongst other proofs of the possession of a reasoning power, that insects, if baffled in one means of accomplishing their object, will generally try another; and that we find them as prompt and skilful in overcoming exceptional and artificial difficulties as in performing the ordinary duties of their lives. The habits of insects, like those of larger animals, appeared to be in a great measure the result of the accumulated experience of many generations. The term "instinct" has too general and vague a signification, and is often used as a convenient means of accounting for what we found it difficult to explain.

After the reading of this paper, several of the members present mentioned examples of animal intelligence, and an interesting discussion followed, in which Messrs. Billings, Whiteaves, Ritchie and Drs. De Sola, Trenholme, Evans and others took part.—*Gazette*

### Exchanges and Books Received.

*The National Normal*, An Educational Monthly, edited and published by R. H. Holbrook, Cincinnati, O., January, 1870.

*The Maine Journal of Education*, February, 1870.

*The Illinois Teacher*, devoted to Education, Science, and Free Schools, February, 1870.

*Ohio Educational Monthly*, a Western School Journal, February, 1870.

*Trübner's American and Oriental Record*, December, 1869.

*The Young Crusader*, February, 1870.

*The Rhode Island Schoolmaster*, February, 1870.

*The Minnesota Teacher and Journal of Education*, February, 1870.

*Littell's Living Age*, Jan. 22, 1870.

The Living Age is so well known and esteemed as an eclectic that any recommendation of ours would be superfluous.

*The Cincinnati Medical Repertory*, edited by J. A. Thacker, M.D. February, 1870.

*The Manufacturer and Builder*, February, 1870.

The low price (\$1.00 per annum in advance) at which this periodical is offered to the public must ensure it a very large circulation. The present no. alone contains 64 articles, 14 of them illustrated, all for 15 cents. Address Western & Co., 57 Park Row, N. Y.

*The California Teacher*, February, 1870.

*The Schoolmaster*, a Monthly Journal of Education, Literature and News, January, 1870.

*The Musical Guest*, February, 1870.

The music in this number consists of three beautiful songs—"Bloom upon the Cherry Tree," by Glover; "In the moonlight at Cape May," and "When you were seventeen, Nellie," by Frank Howard. The *Guest* is only \$1.00 per year. Sample copies 10 cents. Address "WHITNEY'S PALACE OF MUSIC," Toledo, O.

*Seventh Report of the Board of Education for Victoria*, for 1868.

Our thanks are due the Hon. J. P. Wickersham, Superintendent of Common Schools of the Commonwealth of Pennsylvania, for a copy of his Report for the year ending June 7, 1869.

Received from Messrs. D. & J. Sadlier & Co., New-York, Boston and Montreal.

"The Poems of Thomas D'Arcy McGee, with copious notes, also an Introduction and Biographical Sketch, by Mrs. J. Sadlier."

Received from Dawson Bros., Montreal.

"The Life of Mary Russell Mitford, edited by the Rev. A. G. K. L'Estrange, in two volumes, Harper Bros., New York, 1870."

## MONTHLY SUMMARY.

### Education.

—The Right Hon. W. E. Forster presiding over a great educational meeting in Leeds, spoke at some length on the position of the education question. He said it was as impossible for the State to interfere in the matter of education as in the relief of the poor without some degree of danger, which must be instantly guarded against. A poor man must be made to understand that education was not given as a matter of charity, but a work of co-operation. It was the duty of Government when dealing with education, to consider the question as a great whole, and it was the business of the State to turn the universities and the endowed schools into great national institutions, to which all parties and all creeds had access. Grammar-schools had been too much forgetful of the poor, and there had been too much aping of the education of Eton. If that departure from the necessities of these days had not occurred, those secondary schools would have better answered their purposes. Speaking of the universities, he said a man could not obtain his degree until he was 22, and he complained that the time was so much longer than it used to be. Boarding-schools, he considered, had arisen from the secondary classes imitating the ways of those above them. It was said they must be very careful how they changed the standard of education, that it would be disadvantageous to those who were born with silver spoons in their mouths. He believed the day was gone by when men were born rulers, and no arrangement would be more unjust to the gentlemen of England than to give them educational establishments exclusively to themselves. The more efficient the education of great schools was made, the more efficient would be the education in the schools for the poorer classes. It had been his duty to inquire into the education of the working classes, and he found unless they made these grammar schools the teachers of what was wanted they would be no longer the schools of the greatest use—schools in which the cleverest boys of the working classes could be brought up. The great feature of his Bill was to make use of these endowments for the development of talent wherever it could be found. At present there was very little chance for a clever boy of working parents. If they were to keep pace with other countries, they could not afford to let any talent lie dormant, and they must call it out and give it an opportunity to rise. He hoped to see every large town in the country rating itself to have one of these reformed grammar schools, because they would see how good they were; and the time would come in all elementary, national, and British Schools, when there would be exhibitions, by means of which the cleverest boys would be able to ascend to the greatest position. He was glad to find that at Birmingham, Feversham, and at other places, including Doncaster, the main provision of his Bill had been anticipated. In his Bill there were two ideas—one a reform of the Endowed Schools by a temporary Commission, and the other a good system of examination and the means of raising the educational profession by means of an Educational Council. This last idea had attracted a good deal of attention in Yorkshire. His first object was to provide some means by which the Endowed Schools, when reformed, might be kept good. He had wished to provide some machinery which should show the trustees how the masters were teaching, and also that there should be a sort of guarantee, by the granting of certificates, that the master appointed was fit for teaching. Schoolmasters were not considered, as they ought to be, as a profession—as one of the noblest professions. He sought to appoint an Educational Council, and the idea was a new one; and he thought the more schoolmasters and parents looked at it the more they would like it. Asking what mechanic's institutions had to do with all this, he said they would be the means of providing bridges from one class of schools to another; so that the poor child should have the chance if he had the faculty, of becoming a scholar for the benefit of his country. Ignorance was weakness, and weakness meant pauperism and crime. There never was a time when people in England were more proud of the glory of their country—and he wished to maintain it, but that could only be done by helping to make each individual stronger and increasing his culture. He would not admit secular teaching being on a par with religion, but the greater faculty you can give a boy the better he was for the clergyman to deal with.

On the following evening, Mr. Forster in addressing his constituents at Bradford, though his speech was mainly taken up with the discussion of the American question, yet found time to touch upon education, and prepared the country for a thorough discussion of our National School System, so soon as the Endowed School Bill has become law. (1) —*Papers for the Schoolmaster.*

(1) It is now law.

—A new public education law has been promulgated at Constantinople. By article 9 primary instruction is made compulsory for every inhabitant of the Turkish empire. The period of instruction for girls is fixed at from six to ten years of age, and for boys from six to eleven. Under article 10 the magistrates of districts and villages are to keep a register of the names of boys and girls whose age qualified them for instruction, together with those of their parents or guardians. If any of these do not go to school the magistrate is to warn the parent or guardian of his obligation and if after such notice the child is not sent to school within a month, and no valid reason is given for its absence, a fine of from 5 to 100 piastres is to be imposed, according to the means of the parent, and the child is to be taken to school by the authorities. The fines are to be paid into the educational fund. The cases of exemption are, first, when the child is shown to have some constitutional defect; second, when the parent is poor, and would suffer loss from his child being sent to school; third, when the child is employed in agricultural labour at harvest time; fourth, when the distance from the residence of the child to the school is more than half an hour's walk; fifth, when there is no school in the district, or when the school is not sufficiently large to accommodate all the pupils; sixth, when proof is furnished that the child is being educated either at home or in a private school. The primary schools are to be either Mussulmans or Christian, according to the religion which is most prevalent in the district. The higher schools, however, are to receive Mussulmans and Christians indiscriminately. An "Imperial Council for Public Instruction" has been established to see to the due execution of this law. Normal Schools are established for male and female teachers. The studies of the higher primary and preparatory schools include Turkish, Persian, Arabic, French, arithmetic, geography, history, geometry, natural history, and political economy.

—An Ottawa paper says:—

"Notwithstanding the vast strides made during the present century in knowledge and civilization, the amount of crime has not lessened. Indeed there appears some reason to believe that it is on the increase. Morality and the observance of law have not kept pace with the advance of education. There never was a time when the latter received so much attention, when it was so widely diffused, and when such earnest efforts were put forth to make it as good and suited to the wants of every day life, as at present. It is fostered and directed by the Government in almost all civilized countries. It is supported by rates. Teachers are trained for the service, and in this country excellent school houses and school equipments are provided. And yet the fact remains, that to all outward appearance, the criminal class is on the increase rather than diminishing.

"It has long been the theory of the optimists that, the general or universal diffusion of education amongst the people would lead to the disappearance from our midst of mendicancy and crime. Education has become generally diffused, and yet the two great social evils of pauperism and crime still remain. This does not by any means tend to prove that education is a bad or undesirable thing. It merely shows that it does not and cannot accomplish what has been expected of it by some over sanguine enthusiasts. There is evidently some other agency required besides to preserve society from moral corruption."

—The University of Edinburgh has authorized the establishment of separate classes for female medical students, an arrangement not found necessary either in France or America, but agreeable to British habits. This concession is due mainly to the energy and perseverance of Miss S. Jex-Blake, who refused to be driven out of Great Britain to pursue her studies, and, after suffering defeat upon defeat, at last persuaded the Senate of the University to open its lecture-rooms to women.

### Literature.

*The Origin of the Word Avoirdupois.*—It is generally accepted that this term is derived from the French *avoir-du-poids*, (to have weight,) and the French also write it in this manner; but no clue is given by this explanation to the origin of the word, as applied to a class of weights.

We find this term for the first time in the fourteenth century, in an Act of Edward III., (statute I.,) where it is written "averdeboiz" and "haberdepois." At first, a certain class of goods was understood thereby; then the weight used for them; and finally, the ordinary weight of commerce. In another Act of Edward III., we read, for instance, "Wool and all kinds of avoirdupois," (that is, avoirdupois-goods.) To these avoirdupois-wares belonged wine and corn. "Averdebois" is met with in more recent times; but all the older forms seem to point to the fact that it originated from the English "average," which meant proportionality, equipoise, poise, (formerly poize, and, in the old French, *poise*,) signifying weight, equilibrium, or balance. To poise (formerly to poize) meant figuratively "to weigh."

The saying, for instance, still prevails, "The weight of a hair will turn the scales between their avoirdupois." Averdupois or avoird-

pois may have been synonymous with average poise, indicating common weight; avoirdupois goods were synonymous with ordinary goods. This derivation seems to be the most natural one; and it is confirmed by the acceptance of the English commission of weights and measures, according to which avoirdupois consists of a corruption of the barbaric Latin word *averia*, which means coarse or common goods, and the French word *poide*, (weight.) The word Troy, for the other kind of weight, is derived from Troja Nova, (New Troy,) a name which was given to London by the monk authors of the middle ages, whose belief it was that this city had been founded by Trojan exiles. Trojan or troy-weight is, therefore, synonymous with London weight.

*Robinson Crusoe.*—The Antiquarian Society of Scotland have received a donation to their museum of two interesting articles, which cannot fail to be attractive, especially to juvenile visitors and all who have read DeFoe's world wide story of "Robinson Crusoe." The relics consist of the sea-chest and a carved cocoanut cup, which were the property of Alexander Selkirk, the prototype of Robinson Crusoe. These were with him in his solitary residence on Juan Fernandez, and were brought home with him when taken off the island by Captain Woodes Rogers. They were used by Selkirk while he lived in Largo after his return to his native place. The chest contained his clothes, etc., and when he went off from Largo was left with his descendants, with whom it and the cup remained till the death of one of them a few years ago, when they were sold to a gentleman in London. They were recently placed in the hands of Mr. Chapman, of Hanover Street, for disposal, and have been purchased by Sir David Baxter, who, with his usual generosity, has presented them to the Society of Antiquaries of Scotland. The chest is made of a species of mahogany, and has Selkirk's initials rudely carved on it, and what seems to have been his number in the ship. The cup was carved by Selkirk while on the island, and was mounted in silver at one time; but having been carried off by a pedler, for some months no trace of it could be got, till it was returned from Perth without its silver stem, for which a wooden one has been substituted. The edge has a silver band with an inscription on it. Only three other relics of Selkirk are known to be in existence. His musket is in the possession of a gentleman in Fife, his brown ware can is in Edinburgh, and his walking-stick is in the museum at Coulter Mains.—*Scotsman.*

*Vellum.*—A contemporary discoursing upon this subject, says: "Of the durability of vellum, or parchment, there can be no doubt. It seems to suffer from no liability to decay, as do wood and iron, The Virgil in the Vatican has lasted since the third century, and may last as many years longer. In the Imperial Library of Paris is a Prudentius of about the same date; and in nearly every public library in Europe are manuscripts of ages varying from 800 to 1,300 years. It is curious, in fact, to reflect that, while many noble monasteries are in ruins, and some even hardly to be identified except by the most zealous antiquaries, manuscripts which were ancient before the abbeys rose from the level of the ground, are now in good preservation. We might, indeed, so far as durability of vellum is concerned, have been at this day in possession of the entire works of those authors of antiquity whom we now know only by a few fragments. During the twelfth, thirteenth, and fourteenth centuries, parchment became excessively scarce and dear. Great estates were sometimes passed from one owner to another by a mere verbal agreement, and the delivery of earth and stone before witnesses. In 1124 the abbot of a monastery in Suffolk could procure no parchment for illuminating a copy of the Bible, and the Bishop of Winton, in 1226, expended five shillings on a small quantity of parchment, at a time when wheat was only two shillings for eight bushels.

—A writer in *Macmillan's Magazine*, after enumerating the inconveniences and injustice which belong to the present state of the international copyright question, thus sums up:

"Now, how should these injuries and scandals be prevented? Diplomats will not be able to do much for us, although several of them, yours as well as ours, are men who love literature. Still we must not look for any signal help from them, unless they are stimulated by the demand of the public on both sides of the water that divides us. It is to the public that I would appeal through you; and I believe that if the American authors, and the American public, would bestir themselves in the matter, they would find that the British authors, and the British public, would be anxious and ready to co-operate with them, and would force upon governments and diplomatists a due consideration of this important matter.

"Why do I say that it is important? For four reasons.

"1. Because the present system, or rather want of system, is injurious to authors, both American and British; especially to the American, for, as I have shown, it tends to suppress him.

"2. Because it is very damaging to literature.

"3. Because it prevents both the American and the British public from profiting by the united and the best efforts in literature of authors having the advantage of writing in that great language which is common to both countries.

"4. Because it hinders the amity of the two nations, which for their own interests and the interests of the world, should be the closest friends.

"Authors are, after all, the people who give the tone to the mind and thought of each generation. They have, at least, much to do with creating future peace or war, far more perhaps than diplomatists or statesmen. It is of great importance that the *genus irritabile* of authors should have a friendly feeling to the inhabitants of other countries if there is to be peace between those countries and their own."

—The statistics of the book trade at Leipsic show that one-sixth of all German books is published there. The increase of the trade may be seen from the fact that in 1789, 835 works, and in 1859, 1,582 works were sent from the Leipsic presses. There are at present in Leipsic 47 printing establishments, which employ 1,000 men, 450 women, 300 apprentices; 100 binding-shops, employing 400 binders and 160 apprentices. The book exchange at the fairs is visited by booksellers from all parts of Germany. At the Easter settling-day in 1868, 3,500,000 thalers changed hands, and it is calculated that the yearly business exceeds £1,000,000 sterling.

—*Opening of the First Free Public Library in Scotland*—The first public library in Scotland was opened here on Thursday by Provost Hay. The inaugural meeting took place in the Great Hall of the Albert Institute, below which the library is situated, and was largely and influentially attended. The Rev. Dr. Taylor opened the proceedings with prayer. The Provost, after making a few remarks as to the advantages which would be afforded by the free library, introduced the Rev. Mr. Gillilan, who moved the first motion as follows:—"That this meeting hails with the greatest satisfaction the opening of the lending department of the free library; commends it to the diligent use and careful protection of the inhabitants of Dundee, and trusts that all the hopes and expectations which have been formed regarding it, as a means of promoting the religious, moral, and social well-being as well as of securing the intellectual progress of the community, may be abundantly realized." Sheriff Guthrie Smith seconded the resolution which was unanimously agreed to. Other resolutions were passed, thanking Her Majesty, the United States Government, and various other contributors for their gifts of books; to the directors of the Albert Institute, for their co-operation in the establishment of the institution; and to the conveners of the various sub-committees who purchased the books. At the close of the meeting the Provost and those on the platform proceeded to the library rooms, where he declared the lending department open to the public. The Provost was then presented by the principal librarian with a borrower's card and a catalogue, and, having selected "The Early Years of the Prince Consort," his name was entered in the ledger of the library as the first reader in the Dundee Free Library. The library, though opened yesterday, is not yet completed as a great many additions have still to be made. It contains 8,000 vols. of carefully-selected books. The classification and arrangement have been carried out on the same principle as that observed in the principal free public libraries in England.—*Dundee paper*.

—A discovery of "lost letters" has just been made, which is of singular interest—nothing less curious than the suppressed correspondence of Charles I. with his friends on the eve of the battle of Naseby. The House of Commons printed at the time a collection of royal letters, under the name of "The King's Cabinet Opened." These letters were thirty-nine in number; but it has been always known that, for reasons of State, a good many of the King's letters were kept back. These suppressed letters are the papers recently found. They are in private hands; but we hope to hear in due time that copies of them, at least, will be obtained for public use.—*Athenæum*.

—Why asked a schoolboy the other day, are not "squoze" and "squozen" right, as well as "froze" and "frozen"? "Squeeze" ought to be conjugated like "freeze." His master could only say it was not. Though the Anglo-Saxon "freason" made its perfect "freas" and past participle "frozen," "cwysan" made its perfect "cwysde" and past participle "gecwysed."

—The Historical Commissioners have got so far into their good work as to have appointed four travelling deputies—one each for England, Ireland, Scotland, and Wales—who will have to visit country houses, and report on the literary treasures which may be found in them.

—Mr. Richard Morris, the well known editor of Early English Texts, whose edition of Spenser is nearly ready, has been appointed Lecturer on English Literature to the Evening Classes in King's College.

—Mr. Thomas Wright is now editing, for the Master of the Rolls, a collection, in one volume, of the Anglo-Latin Satirical Poets of the twelfth century.—Nisellus, John de Hauteville, &c., which will, there can be no doubt, throw great light on the social history of the age, as well as its political history. Mr. Wright is also preparing for press a revised and greatly enlarged edition of his "History of Women in the Early Ages.

## Science.

—*International Standard Measures*.—The metrical system and the standard measures of France have occupied the attention of the Academy of Sciences of Paris more than once of late. M. Chevreul, the eminent chemist, took an opportunity to protest scientifically against the adoption, for the purposes of a standard measure of length, of a measurement of a portion of a meridian of the earth, which had not at the time, and has not yet, been positively determined, but for practical reasons arrived—as Puitsant and a commission of the Academy had already done—at the conclusion that the standard mètre of the year VIII, preserved in the archives of France, should be maintained, and proposed that an international commission should undertake the task of multiplying copies of such mètre and other standard measures, calling to its aid for such purpose all the scientific means in existence. A note was read before the Academy, showing that the Academy of St. Petersburg, adopting the same ideas as M. Chevreul, had expressed the desire that its members should, in future, use none other than the French metrical system in their publications; that it had constantly recommended its adoption by the various branches of the Russian administration, the universities, and scientific corporations; and stating that next year the meteorological observations in Russia will be published in the metrical system. At a subsequent meeting of the Academy, it was announced that the Berlin Academy of Sciences had adopted the decision of the St. Petersburg Academy respecting the metrical system, and accepted the existing mètre and kilogramme as absolute standards of measure, and joined in the recommendation of an international commission for the production of prototypes. The assent of the Royal Society of Great Britain to these propositions is hoped for as all that is needed for the adoption of a general international metrical system.—*Engineering*.

—*Cabs for the Sick*.—The question about special conveyance for patients suffering under infectious diseases has been placed under a new aspect by Dr. Barbour, the resident medical officer to the Fever Hospital, who writes to the *Times* to say that within the last month three patients have died in cabs on their way to the hospital. Practitioners well know, the *Lancet* states, what is unfortunately not so well known to the public, that fatal syncope is frequently induced by raising a patient suffering from exhausting disease into an erect or semi-erect position; and that the action of so-called nurses who lift up the sick to "take something" is a frequent cause of immediate death. The fact stated by Dr. Barbour affords an additional reason why special vehicles should be provided, not only to afford safety against infection, but to make provision for recumbency. In the mean while, it is highly desirable that any medical man who sanctions the removal of a patient should give such instructions to the friends as may afford the greatest possible safety against this particular danger.

—*Milk Nourishment*.—In his thesis on milk nutriment, Mr. Leclerc explains accurately, remarks the *Gazette Médicale de Strasbourg*, the advantages of this form of aliment, pointing out the rules for its use, and the diseases which demand the exclusive employment of milk. Twelve cases, collected from the clinique of Professor Hirtz, illustrate the thesis. The dietary is scientifically established, and the quantity calculated for an adult at four litres. The milk is an aliment of easy and rapid digestion, which leaves little residue, and favours diuresis. It is specially in organic affections, in ulceration of the walls of the digestive tube, in hypertrophy of the heart and dropsy that this diet has rendered real service. Patients must follow it out strictly, for the least departure from the rule results in relapses.

—*Influence of Weather on Health*.—The *Lancet* alludes to a report by Dr. Stark on this subject, and says:—The chief feature of Dr. Stark's present report is the valuable series of observations he has collected illustrative of the influence of season or weather upon health. Facts extending over for ten years 1855-64, show that, taking Scotland as a whole, February is the month most generally fatal to the population, and September the least so; that in the six colder months of February, March, January, April, December, and May, the deaths average more than 1,000 per month—the monthly mortality being below 1,000 in the other six months. As might be expected, the town population are found to be more sensitive to the agencies of the weather than the more robust dwellers in rural districts, as is shown both in the earlier hurtful effect of cold and in the earlier beneficial influence of warmth on the health of the former of these two classes. That the first advent of cold weather is much less prejudicial to health than its continuance for any length of time, is corroborated by the observation that though the mean temperature of February is no higher than that of January, the mortality is much higher, the vital powers being weakened by the sustained cold. The prevalence of northerly and easterly winds in Scotland during March, April, and May, super-vening on the cold month of February, accounts for the fact that March is the second most unhealthy month in the year.

**Art.**

—Recently a statue of Sir D. Corrigan, Bart., was presented to the Royal College of Physicians of Ireland, of which institute Sir Dominick has been president during five years,

—*Public Monuments.*—A vote of £2,800 on account of the Wellington monument is to be proposed to the House of Commons this session. The original estimate for the monument was £14,000; £10,266 had been expended upon it up to the end of 1868, leaving £3,734 to be still voted. A vote will also be proposed of £667 towards the erection of a monument in Westminster Abbey to the memory of Lord Palmerston. The estimate for this monument is £2,000. £1,333 had been expended up to the end of 1868; the present vote, therefore, will complete the estimated amount

—*Monument to Dr. Whewell.*—The Master and Fellows of Trinity College, Cambridge, have just decided to intrust to Mr. Woolner the execution of a monument to Dr. Whewell, which is to be placed in the ante-chapel of the college.

—A Journal of Finland states that a painting by Rubens, representing a "Descent from the Cross," has just been discovered in the church of Elenas. The inhabitants were not aware that they possessed such a treasure, although the picture had always attracted the attention of connoisseurs. Last summer three artists, named Shestrand, Lowgreen, and Munsthelm, being on a visit to the town, declared positively that the work was a Rubens. An inquiry was then instituted, and showed that the painting had been brought from Germany in 1650 by Count de Loewenhaupt, who presented it to the town. It is said to have been restored by the artist Lindau in 1821.

—The death is announced of Mr. William Essex, enamel painter in ordinary to her Majesty and the late Prince Consort. The deceased was 85 years of age.

—A tomb has just been completed, at Kensalgreen Cemetery, to the memory of Samuel Lover. The tomb is formed of white Carrara marble, and upon the top a shadow-cross has been erected. The following is the inscription on the tomb: "Samuel Lover, Poet, Composer, Novelist, and Painter, born February 24, 1797; died July 6, 1868. 'Thy rod and thy sceptre comforted me.'"

**Discoveries and Inventions.**

—Mr. G. H. Cordes, of Bremerhaven, has invented a new apparatus for saving the shipwrecked. For the experiments that have as yet been made, a one-pounder has been used, which a single man is able to move and direct when the ground is favourable. The projectile, remarks the *North German Correspondent*, weighs about 20 lbs., and by means of it a line may be thrown a distance of from 1,000 to 1,200 ft. A light four-pounder will cast the line about 2,000 ft., and a six-pounder from 2,500 to 3,000 ft. As at first the velocity is not great, there is but small danger of breaking the line. Two kinds of projectiles are employed; one for stations on the coast, by which a line may be cast to ships in distress, while the other is intended for the vessels themselves. When it strikes it forms an anchor, so that a connection may be established with the land without any assistance from the shore. The whole apparatus is much cheaper than the rockets now in use

—*Interesting Discoveries at Florence.*—A number of coins, 1,419 in all, have been found in the convent of St. Annuciata, at Florence, and have come into the possession of the National Museum; 2 are of gold, 58 of silver, and the remaining 1,359 of copper. The gold pieces bear the likeness of Valentinian II, and Justin III. Of the silver coins, there are 1 of Julius Cæsar, 2 of Pompey, 9 of Marcus Antonius, 2 of Octavian, 1 of Tiberius, 2 of Trajan, and 2 of Antoninus Pius. Several Etruscan, and Volscian pieces are to be found among the copper coins—1 of King Juba, 28 of Caracalla, 11 of Heliogabalus, 33 of Constantine, 1 of Alaric, King of the Goths, and 167 of the Free Cities. Besides these, 162 old medals were found, and a number of small works of art in a glass vessels, vases of various forms, and three lamps.

—*Improved Cabs.*—The Council of the Society of Arts have offered the following medals for improved hackney carriages specially suited for the metropolis:—The Society's Gold medal for the best and most convenient open hackney carriage for two persons; the Society's Silver Medal for the second best ditto; the Society's gold medal for the best and most convenient closed hackney carriage for two persons; the Society's silver Medal for the second best ditto; the Society's Gold Medal for the best and most convenient closed hackney carriage for four persons; the Society's Silver Medal for the second best ditto. Lightness of construction, combined with adequate strength and durability, will be especially considered in making the awards.

—During an excavation made in Pompeii a short time ago, the objects turned up were, a human skeleton, almost perfect, a pair of gold ear-rings

with pearls, a gold bracelet and five gold coins, 782 silver coins, three silver rings, and sixty-seven pieces of bronze money. The coins were all of the Consular and Imperial periods. The jewelry and coins will be placed almost immediately in the Naples Museum, and the skeleton in the Pompeii Museum, together with the human remains previously discovered.

—*Coal in Notts.*—The discovery had recently been made, the *Sheffield Independent* says, that immense quantities of coal exist throughout the whole of the district lying in the neighbourhood of Nottingham, and important mining operations are accordingly now in progress. There is said to be sufficient coal under Wilford estate to make Mr. Markham-Clifton, the new proprietor, the richest man in the North Midland counties. It is also anticipated that the Nottingham Corporation will find coal under their land, and it is suggested that they should open collieries.

—*Curious Geological Formations.*—It is stated by one of our foreign exchanges, that near the city of Medina, in Italy, and about four miles around it, wherever the earth is dug, when the workmen arrive at a distance of sixty-three feet they come to a bed of chalk, which they bore with an auger five feet deep. They then withdraw from the pit before the auger is removed, and upon its extraction the water bursts up though the aperture with a great violence, and quickly fills the newly-made well, which continues full, and is affected by neither rain nor drought. But what is most remarkable in this operation is the layers of earth as we descend. At the depth of fourteen feet are found the ruins of an ancient city, paved streets, houses, doors, and different pieces of mason-work. Under this is found a soft, oozy earth, made up of vegetables, and, at twenty-six feet, large trees entire, such as walnut-trees, with the walnut still stuck to the stem and the leaves and branches in a perfect state of preservation. At twenty-eight feet deep a soft chalk is found, mixed with a vast quantity of shells, and the bed is eleven feet thick. Under this vegetables are found again.

**Botany.**

—*A Wonderful Flower.*—"Come with me, sir; come! A flower very large and beautiful, wonderful!" exclaimed a Malay, who drew the attention of Dr. Arnold to a flower remarkable alike for its enormous size and its anomalous structure and habit. And the surprise of the Malay was nothing compared with that of Dr. Arnold and his companions, Sir Stamford and Lady Raffles, when, following their native attendant, they saw among the bushes of a jungle a flower apparently springing out of the ground, without stem or leaf, and measuring at least a yard in diameter. The first news of this remarkable discovery created a great amount of curiosity in Europe, and no papers ever read at the Linnean Society can be compared, for the interest they excited, with those in which the illustrious Robert Brown described this wonder of the vegetable world. The most striking feature in the *Rafflesia* is its enormous size; indeed it is the largest and most magnificent flower in the world. It is composed of five roundish leaves or petals, each a foot across, of a brick-red colour, but covered with numerous irregular yellowish-white swellings. The petals surround a large cup nearly a foot wide, the margin of which bears the stamens; and this cup is filled with a fleshy disc, the upper surface of which is everywhere covered with curved projections, like miniature cows' horns. The cup when freed from its contents, would hold about twelve pints of water. The flower weighs fifteen pounds. It is very thick the petals being from one to three-quarters of an inch in thickness. A flower of such dimensions and weight might be expected to be a treasure to the perfumer; but, alas, its odour is exactly that of tainted beef! Dr. Arnold supposed that even the flies which swarmed over the flower when he discovered it were deceived by its smell, and were depositing their eggs in its thick disc, taking it for a piece of carrion! Another cause of wonder to the little band of explorers who discovered it was that they could find no leaves connected with it. It sprang from a small, leafless, creeping stem, about as thick as two fingers. Now, a plant without leaves is like an animal without a stomach; for the leaves are to the plant what the stomach is to the animal; they separate from the air the food needed for the growth of the plant. There are, however, strange plants which are actually leafless, making up for this want by using the leaves of others. Such plants are called parasites, because they feed on the nutritive juices of others. Thrusting their roots into the living tissues of other plants instead of into the earth, they appropriate the prepared food of these plants, and at once apply it for their own purposes for the production of stem, flower, or fruit. The gigantic *Rafflesia* belongs to this class. Without a vestige of foliage, it rises at once from the long, slender stems of one of the wild vines of Sumatra—immense climbers, which are attached like cables to the largest trees of the forest. The buds push through the bark-like little buttons, continuing to grow until they have the aspect of large closed cabbages, and in about three months after their first appearance the flower expands. It remains but a short time in perfection, soon beginning to rot, leaving only the central disc, which becomes a large, rough fruit, filled with multitudes of small, simple seeds.—*World of Wonders.*



**Meteorology.**

—From the Records of the Montreal Observatory, lat. 45° 31 North; Long. 4h. 54m. 11 sec. West of Greenwich, and 182 feet above mean sea level,—for Jan., 1870,—By CHAS. SMALLWOOD, M.D., LL.D., D.C.L.

DAYS.	Barometer corrected at 32°			Temperature of the Air.			Direction of Wind.			Miles in 24 hours.
	7 a.m.	2 p.m.	9 p.m.	7 a.m.	2 p.m.	9 p.m.	7 a.m.	2 p.m.	9 p.m.	
1	30.281	30.262	30.199	20.9	22.4	16.2	wbyN	nbye	nbye	104.29
2	29.901	29.560	28.801	12.1	28.5	32.0	nE	nE	nE	112.00
3	.061	.272	29.364	34.0	34.9	30.3	sW	sW	sW	211.20
4	.575	.642	.661	20.1	27.7	24.3	w	w	w	317.00
5	.974	30.087	30.152	14.3	18.5	11.9	w	w	w	104.00
6	.898	29.222	29.852	22.0	31.4	30.1	sW	sW	w	84.29
7	30.000	30.072	30.150	3.3	14.7	3.1	w	w	wbyN	219.29
8	.049	.002	29.961	-5.0	3.2	2.1	wbyN	nE	sE	324.14
9	.252	.350	30.251	-1.0	11.3	2.2	w	w	w	204.10
10	.052	29.972	29.947	3.2	10.3	13.9	sW	nE	nE	91.17
11	.161	30.217	30.349	18.7	27.6	18.1	w	w	w	70.24
12	.021	.019	.051	16.0	19.1	21.7	w	nE	nE	90.00
13	.289	.333	.547	2.1	-4.0	-6.1	nE	nE	n	247.12
14	.772	.774	.649	-20.4	-1.7	-7.7	n	n	w	242.10
15	.184	29.751	29.499	5.0	31.6	32.0	nE	sW	sW	104.29
16	.051	30.177	30.275	31.6	37.1	34.1	w	w	nE	237.47
17	.000	29.798	29.601	32.3	35.7	37.0	sW	s	s	91.12
18	.252	30.473	30.479	21.0	22.1	20.0	w	w	w	311.10
19	.561	.471	.411	12.3	31.6	19.2	w	w	w	61.74
20	.212	.401	29.957	18.9	35.1	29.2	w	w	w	189.70
21	.049	.200	30.300	22.2	30.0	18.4	nE	w	w	104.00
22	.501	.346	.101	11.7	26.0	29.9	w	sE	sE	91.11
23	29.947	29.998	.106	34.1	39.7	17.9	sW	sW	w	79.24
24	30.451	30.420	.347	4.0	12.4	8.7	w	nE	nE	111.49
25	29.901	29.452	29.549	11.4	17.7	17.0	nE	nE	nE	170.00
26	.551	.801	.900	32.0	39.2	35.0	wsW	wsW	wsW	79.11
27	30.101	30.157	30.275	27.7	39.0	22.1	wsW	wsW	wsW	80.04
28	.362	.344	.311	18.0	26.0	18.2	w	nE	nE	89.20
29	.024	29.879	29.700	12.9	30.0	20.6	nE	s	s	70.00
30	29.849	.979	30.062	25.9	31.7	17.0	w	nE	nE	82.24
31	30.149	30.007	29.921	-2.9	13.3	10.1	wbyE	nbye	sbyR	104.12

*Remarks.*—The highest reading of the Barometer was on the 14th day, and indicated 30.774 inches; the lowest was on the 4th day, and was 28.750 inches, giving a range of 2.024 inches.

The mean temperature of the month was 19° 21, which is somewhat more than 5° higher than the *Isotherm* for Montreal. The highest temperature was on the 23rd day, and was 89° 7. The lowest temperature was on the 14th day, and was 20° 8 below zero, giving a monthly range of 60° 6.

Rain fell on six days amounting to 1.586 inches. Snow fell on sixteen days, amounting to 31.89 inches.

—Meteorological Observations taken at Quebec, during month of January, 1870; Latitude 46° 48'30" North; Longitude 71° 12'15" West; Height above St. Lawrence 230 feet,—by Sergt. John Thurling, A. H. C., Quebec.

Barometer, highest reading on the 14th.....	30.549 inches.
"    lowest    "    3rd.....	28.961
"    range of pressure .....	1.588
"    mean for month (reduced to 32°).....	29.829
Thermometer, highest reading on the 17th.....	41.2 degrees.
"    lowest    "    14th.....	-14.4
"    range in month.....	55.6
"    mean for month.....	16.0
Hygrometer, mean of dry bulb.....	16.6
"    "    wet bulb.....	15.1
"    "    dew point.....	3.6
"    elastic force of vapour.....	.051 inches.
"    vapour in a cubic foot of air.....	0.6 grains.
"    "    required to saturate do.....	0.5
"    mean degree of humidity (Sat. 100).....	56
"    average weight of a cubic foot of air.....	582.1 grains.
Cloud, mean amount of, (0-10).....	7.1
Ozone,    "    "    (0-10).....	3.3
Wind, mean direction of " North.....	6.50 days.
"    "    "    East.....	5.50
"    "    "    South.....	5.75
"    "    "    West.....	12.25
"    "    "    calm.....	1.00
"    "    daily horizontal movement.....	172.1 miles.
Rain fell on.....	2 days.
Snow fell on.....	22 do.

*Correction.*—The lowest reading of the Thermometer at Quebec in Dec. last was 5.0 degrees below, instead of above, zero as given in our last no.

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