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THE CANADIAN JOURNAL.

NEW SERIES.

No. XIV.—MARCH, 1858.

THE PRESIDENT'S ADDRESS.

BY THE HON. CHIEF JUSTICE DRAPER, C.B.

Read before the Canadian Institute, January 9th, 1858.

Honored by being a second time placed in the position of your President, it would ill become me to dwell upon what you have so generously overlooked: my want of adequate fitness for the discharge of the duties of that office. I will thank you, however, for the testimony you give that you believe in the sincerity of my desire for the success and advancement of the Canadian Institute, and will endeavor to derive greater confidence in myself for the future from this sanction and approval on your part of that which is past, and will here borrow, as not wholly inapplicable, the language of Montesquieu on a somewhat similar occasion,—“Soit que vous m’ ayez fait justice—soit que j’ai séduit mes juges, je suis également content de moi meme—le public va s’aveugler sur votre choix— il ne regardera plus sur ma tête que les mains savantes qui me couronnent.”

It is a highly gratifying circumstance, that, notwithstanding the commercial difficulties of the past year, the Report of the Council for 1857 affords as great proof of satisfactory results as did that of 1856; and the continued success of the Journal of the Institute, the accession of new members, the numerous donations to the

library and the museum, the increased attendance at the meetings, and the character of the papers communicated thereat, are all justly set forth as legitimate subjects of congratulation.

In reference to the papers communicated, we are well reminded, by the Committee editing the Journal, that the contribution of materials for its pages, from the members of the Society generally, is indispensable to its permanent success. We have no right to expect that the burden of supplying the requisite matter should be cast upon a small minority of those who ought to constitute the working members of the Institute. Of the value of the services rendered by those whose exertions have given to the Journal of the Institute its present character and reputation, we cannot speak or think too highly. It would be, on the part of those who are competent—and I will not doubt but that, among our 600 members, there are many competent,—a just mode of shewing that they fitly appreciate these labours, by sharing, and so lightening them. In adding to the record of facts and phenomena observed, there are few who could not render their quota of assistance; and such a record becomes a treasury of knowledge for philosophic investigation, for elucidating truths already known, or the discovery of others yet hidden from us.

I should be wanting, alike to the Council and to the Institute, if I did not especially call attention to the success of the Journal, so justly attributed, in the Annual Report of the Council, to the ability and judgement of its conductors. It is no slight proof of the value of such a publication, and of the character of those papers which have become known through its pages, that several of them have been deemed worthy of republication in some of the leading scientific journals of Europe; while in return for copies of the Journal transmitted to different societies and learned bodies in other parts of the world, the Institute has already received their printed proceedings, together with other publications of great value. Everything tends to shew the reputation and standing which, through the Journal, this Institute is attaining; and strengthens the claim to our sincere and warmest thanks, which the Editor, and the Committee who have been his coadjutors, have so amply established.

I must not leave the subject of our own proceedings as an Institute, however, without adverting to the fact—within all your recollections,—that at one of the ordinary meetings last year, a tribute of profound respect and regard, mingled with unfeigned sorrow for his melancholy death, was paid to the memory of the late Hugh

Miller, by one of our number. We cannot look back on the last year, and call up before us the events most interesting to those engaged in the cultivation of scientific pursuits, without pausing for a moment over this sad reminiscence, and taking comfort in the reflection—which was suggested on the occasion to which I have referred,—that in the profoundest depths of geologic research, the laborious exertions which overwrought the brain, never made Miller a less devout believer in religious truth. He seems to have proved in his own life-history, what Bacon has so well expressed,—“It is true that a little philosophy inclineth man’s mind to atheism; but depth in philosophy bringeth men’s minds about to religion: for while the mind of man looketh upon second causes scattered, it may sometimes rest in them and go no further; but when it beholdeth the chain of them confederate and linked together, it must needs fly to Providence and Deity.”

Turning once more to domestic matters, I shall beg permission to occupy your attention with a few observations touching the Magnetic and Meteorological Observatory in this city; which I am the more induced to do from a doubt whether the intrinsic value of the establishment, and its effects in making Toronto known throughout the civilised world as the seat of this Observatory, are sufficiently valued and appreciated among us.

Established at the instance of the Royal Society by the Imperial Government, this Observatory formed one of a chain of stations which were, almost simultaneously, called into existence, either by national support or private liberality, over the whole face of the globe, and were designed, in connection with exploring expeditions, both by sea and land, to furnish the data by which it was hoped the secrets of that mysterious agency, the earth’s magnetic force, might be laid bare. Its existence was prolonged much beyond the period which had originally been proposed, and which was found quite insufficient for the accomplishment of the work,—the liberality of the Imperial Government being successfully appealed to by the same learned body to whose exertions its institution was due,—and when ultimately the period arrived when its abandonment was no longer to be deferred, the offer was made to transfer it to the Province with its complete equipment, free (with slight exceptions) of cost, and subject only to the condition of its permanent maintenance. It is a just ground for congratulation that this generous offer was accepted, and that the Province has responded to the call of Science, not only by providing an ample endowment for the Observatory, but by replacing the temporary

wooden structure in which its operations were formerly conducted, by handsome and substantial erections of stone. It may fairly be allowed to the members of this Institute to indulge the belief that these desirable results were effected, in part at least, by the urgent representations which they and their President at the time made to the Government ; nor will the pardonable pride they may feel in the matter be lessened by the knowledge that, out of all the Colonial Observatories which were in similar circumstances, this is the only one the retention of which has been accomplished. The outlay on the Observatory for its erection and equipment from first to last has probably exceeded £5,000, and I believe that in completeness and efficiency it is not surpassed, if even equalled, by any observatories in the world. Three large quarto volumes, containing the observations made here, have already been published by the Imperial authorities (and a fourth is yet due), carrying the name of Toronto into all parts of the earth where science is cultivated ; and so remarkable and valuable have been the theoretical results deduced from them (to which I shall presently more particularly allude,) that it is not too much to say that the name of a Canadian city, which will be sought for in vain on maps twenty years old, has now become, by means of its Observatory, familiar in the mouths of European savans as a "household word."

Very few, if any, subjects of inquiry are of greater interest and probable importance to science, than that of terrestrial magnetism. Practically familiar, as we have been, for a long course of years, with many of its phenomena, the theories invented to account for and to explain them were more owing, as has been well remarked, "to the boldness of ignorance than to the just confidence of knowledge;" and the "want of a foundation whereon the advancement of that science, on inductive principles, might be based, was strongly and extensively felt."

The objects of the Magnetic Observatories were, as I understand, to investigate the periodical variations in the terrestrial magnetic force, by suitable instruments and methods ; to separate each from the others, and to seek its period, its epochs of maximum and minimum, the laws of its progression, and its mean numerical value and amount ; that, by a combination of the results attained, a general theory of each, at least of the principal periodical variations, might be derived ; and tests be thus supplied, whereby the truth of physical theories propounded for their explanation might be examined. With the observation of their *periodical variations*, was combined a comparison with meteorological variations of a

periodical character; which together with those "*secular changes*," which with slow but systematic progression alter the whole aspect of the magnetic phenomena on the surface of the globe, from one century to the next, and which in their nature are not improbably intimately connected with the causes of the magnetism of the globe itself," were deemed subjects of inquiry of the highest importance by "those who, by the inductive process, would seek to ascend to general laws and to the discovery of physical causes."

It is beyond my province, and still more beyond my power, to attempt to trace and define the progress of these observations, and the results which, so far, have been attained. But I am justified in remarking, that the observations recorded here in Toronto, occupy a very high place in the estimation of those scientific men whose attention is devoted to this interesting branch of science. Major General Sabine, himself a member of the Committee of the British Association for the Advancement of Science, by which the attention of Her Majesty's Government was solicited to the expediency of establishing fixed Observatories in the British Colonies, has remarked that the observations at the station at Toronto considerably exceeded 100,000 in number: that "Toronto is the first and, as yet, the only station at which the numerical values at every lunar hour of the lunar-diurnal variations of the three elements," viz.: the horizontal direction, the dip, and the intensity of the magnetic force, "have been published." And he pays this handsome tribute to those who have had charge of this Observatory: "It is with much satisfaction, and with a well-deserved recognition of the pains which have been bestowed by the successive Directors of the Toronto Observatory and their assistants, that I am able to refer to the determinations of the absolute values and secular changes of the three elements contained in the third volume of the Toronto Observatory, in evidence that the instrumental means that were devised, and the methods which have been adopted, have proved, under all the disadvantages of a first essay, sufficient to determine the data with a precision which is greatly in advance of preceding experience, and, as far as may be judged, equal to the present requirements of theoretical investigation. This is the more deserving of notice, because Toronto is a station where the casual and periodical variations, which it was apprehended would seriously interfere with the determination of absolute values, are unusually large. We may derive, therefore, from the results thus attained, the greatest encouragement to persevere in a line of research which is

“no longer one of doubtful experiment, and to give it that further extension which the interests of science require.”

That the task of determining the true laws of the phenomena observed, is, as yet, very far from being accomplished, cannot be denied; but this should not for an instant create doubt or hesitation. Nearly two centuries have been found insufficient to work out all the consequences of the principle of gravitation. The discoveries, with regard to magnetism, are apparently only opening out to view wider and wider fields of inquiry. Professor Faraday, in speaking of the coincidence which has been observed between the maxima and minima of the daily magnetic variation in declination, and the increase and decrease of the solar spots, remarks that “the observation of such a coincidence ought to urge us more than ever into an earnest and vigorous investigation of the true and intimate nature of magnetism, by means of which we now have hopes of touching, in a new direction, not merely this remarkable force of the earth, but even the like powers of the sun itself.” To this it may be added that a similar anticipation may be indulged with regard also to that luminary which “governs the night,” when we remember that remarkable discovery of the variation in the earth’s magnetic force, which has been shewn by General Sabine—chiefly from the Toronto observations,—to depend on the place of the Moon.

In addition to the foregoing testimony in reference to the Observatory, Major General Sabine, at the Dublin meeting of the British Association, last year, instituted a comparison between the observations at Toronto and those made by Captain McGuire and the officers of H.M.S. Plover, at Point Barrow, in 1852-3-4, when employed in searching after Sir John Franklin; and when they found employment during seventeen months unremittingly, in observing and recording, every hour, the variations of the magnetical and concomitant natural phenomena, on that dreary and inhospitable ice-bound shore. The selection of the observations at Toronto, for the purpose of comparison, is a proof as well of the accuracy of the observations themselves, as of the value of Toronto as a place for an Observatory; and we may congratulate ourselves, that the Provincial Government resolved on recommending to the Canadian Legislature, and that the latter most liberally responded to the recommendation, to continue the Observatory as a Provincial establishment, placing the financial responsibility and the general oversight, under the control of the Senate of the University of Toronto.

The Canadian people, by whom the advantage of the electric tele-

graph is so thoroughly understood and appreciated, cannot fail to remember that this,—one of the most surprising, as well as the most useful boons, which the application of modern science has bestowed upon mankind,—was dependent on the discovery of those laws of electricity and magnetism which are being further evolved, by the means of such careful and unbroken notings of varying phenomena as have been for years recorded at our own Magnetic Observatory.

Such an establishment is worthy of the rising character of this fast-growing community, and affords to foreign countries one of the best proofs of our real advancement. Our progress and improvement have been wrung from a soil which, however fertile, was covered with a dense and pathless forest; and the toil necessary to reclaim it left to the laborer little force, and even less of time and opportunity, for mental cultivation. It cannot, therefore, be a matter of surprise that attempts at intellectual progress should have tarried for the material progress which has been so successfully achieved; that efforts to cultivate the sciences, the æsthetic arts, the abstract philosophy, in which consist the true elements of national greatness, should but recently commence, and by degrees occupy the thoughts and attention of the people; and it is in this view that the Toronto Magnetic Observatory becomes a subject of honest congratulation. It is a thing of a world-wide character, designed to co-operate with all other nations engaged in similar researches, and founded in the most generous spirit of philanthropy, which seeks to benefit as well future generations as our own: by the accumulation of truths, the full development and practical application whereof will only be known and made available to those who come after us, to fill our places in this busy world.

Nor can I refrain, in this place, from making an allusion to one especial advantage which a full mastery of the laws of magnetic science will confer upon commerce, in respect to the use of iron ships, which, from the material of which they are constructed, render the magnet useless, unless the influences of local attraction can be overcome. More than one disaster has arisen from this cause; and it is only to a perfection of the science that we can look with hopeful confidence for an effectual remedy; for it has been found that this local attraction itself is dependent, in iron vessels, on the exercise of an inducing effect by the earth's magnetism, and varies with it according to laws the course of which has yet to be traced. The importance of this consideration will be the better appreciated, by remembering that the *Leviathan*—that wonder of naval architecture,

which, if successful, will probably bring about a complete revolution in our commercial marine,—is built of iron, and that however fully, in other respects, the expectations of her projectors may be answered, her success cannot be deemed perfect while this element of difficulty and danger remains. Nor can I omit to call on the Institute to join with me in deploring the death during the past year of a distinguished philosopher, whose name is especially connected with this subject, and to whom most of the improvements in the correction of the Mariner's compass are due. I allude to the lamented Dr. Scoresby.

The hopeful anticipations which were indulged in at our last annual meeting, respecting the Atlantic telegraph, have not as yet been realized. But we may still, I firmly believe, continue to indulge them, and treat their realization as merely postponed. The disappointment of last season has not shaken confidence in the ultimate success of the undertaking. The check that has been met with will but stimulate the ardor and ingenuity of those who are entrusted with its execution. Nothing has happened to create a doubt that the end is attainable, and that the means, in important particulars at least, are well adapted to attain it. No unforeseen obstacle of an insurmountable character has been found; nor has anything happened which should give rise to a fear that any such obstacle in reality exists. The accidental failure—for it is to be looked upon in no worse light,—may possibly give rise to some change in the details of execution, and may suggest further precautions and still more careful preparations for the next attempt. The indispensable qualifications of those employed in the work; their steady subordination and undeviating compliance with the directions given for their guidance; and the undivided—I had almost said despotic—authority of the one master-mind which is to superintend, will no doubt be sedulously secured, and under the blessing of that Divine power which ruleth the raging of the winds and the seas, we shall shortly behold the Old and the New World brought closer together by the rapid interchange of friendly and mutually advantageous communications. And viewing the electric chain which shall thus unite them as a bond of peace and good will between the descendants of one common stock, we may well from our inmost hearts echo the dying words of father Paul, "*Esto perpetua.*"

But while the practical application of the discoveries of science to the intercourse of nations, is calculated to produce such widely extended and beneficial results, its study and cultivation generate among its followers a large and generous spirit independent of national

or political distinctions. This was most happily evinced during last summer in the meeting of the American Association for the advancement of Science, held by special invitation, at Montreal; an assembly which seems to have been—as it was well to be hoped and expected—alike gratifying to the members of learned Associations there assembled, and to the inhabitants of the city whose hospitality was so freely tendered and so frankly received. Possibly the universal desire to extend a hearty welcome to their visitors, joined to that thirst for knowledge which is characteristic of the fairer part of the Creation, by causing “a gay assemblage of ladies which graced the entertainment,” may have produced among the more susceptible of the scientific assemblage a somewhat divided homage, which the sterner votaries—anchorites, who had for the occasion emerged from their studious cells,—disapproved of, as inconsistent with the devotion due alone at the shrine in whose honor they had met. But it is also satisfactory to find that many valuable contributions to science were made in the different addresses delivered and papers read, and that the kindly feeling created by the visit of the Canadian deputation to Alba., in the preceding year was strengthened by the Congress of Scientific men, American and British, gathered at Montreal. We, as Canadians, may also be permitted to indulge in an honest self-congratulation at the position maintained at both places by our scientific representatives.

I must be allowed to state to you, for it was to my position as your President that I attribute the distinction, that during my recent visit to England, I was a guest at the Celebration of the 104th Anniversary of the Society for promoting Arts, Manufactures and Commerce, on the 23rd June last, and sat next the noble Lord who presided on that occasion. The gratification I there experienced in the Society of many men of distinguished reputation in various branches of Science and Art, was greatly enhanced by the reflection, that my invitation was a mark of friendly interest and regard for this Colonial Institute with which it was my good fortune to be thus connected, and was an evidence of the increasing interest felt at home in the advancement and prosperity of Canada.

It is the hope that our Institute may in time accomplish for this Province what the Royal Societies of London and Edinburgh, and other kindred societies such as the one I have just referred to, have done for Great Britain, that must animate us to perseverance and additional exertion. We may confidently look for all the encourage-

ment and coöperation which men of education and of habits of intellectual thought among us can give. To maintain and to advance this Institute are in more senses than one the duty of enlightened patriotism. In a country governed through the medium of representative institutions, and in which the greatest possible amount of civil and religious liberty is enjoyed, it is impossible but that differences of a political or of a sectarian character must prevail. While the community, though rapidly increasing, is yet comparatively small, there is greater danger than exists on a larger theatre, that such differences should degenerate into personal hostility or individual rancor. But here, in this Institute, may be found an arena where no such differences can ever be permitted to find an entrance. It is here that all those who appreciate the worth of science and its power to contribute to the real wealth, the true greatness of the country, may find a common ground of action; where the love of knowledge, the refinement of education, the grace of scholarship, may, for the time at least, smooth the asperities of other pursuits, and exercise a healing influence, before which the bitterness of sectarian and party contentions shall at last disappear.

We may well aspire to join ourselves to those who are advancing the triumphs of scientific discovery, and are applying those discoveries to the benefit of their fellow men; to form part of that mighty host, who in the increase of knowledge perceive an augmentation in the excellence of their own condition, making intelligent man still more intelligent. Never was there an era wherein greater triumphs have been wrought, nor upon which such a bright future seems to open itself. The very greatness of present success seems almost calculated to make us doubt its reality; and if it were not that we stand upon facts and not upon theories, we could scarce credit the wonders we see, far less anticipate that they are but the precursors of still greater success. The transmission of our corporal selves is now so accomplished that we scarcely know whether most to wonder at the speed at which we move, or at the possibility of uniting safety with it; while for the transmission of inquiry or intelligence, of thought or of wish, space may be almost said, without hyperbole, to be annihilated. The energy and perseverance which in recent years have solved and are solving so many problems in geography, have in like manner advanced actual discovery into unexplored or imperfectly known regions of science, which,—like this western continent,—at first suspected by the profound thinker, and next foretold by the more imaginative enthusiast, were at last and after repeated failures, followed always by

renewed efforts, discovered and made fully known. While rendering a just homage to those who have made plain hitherto untrodden paths, let it not be forgotten how much remains to be known, how far we are, after all that has been accomplished, from a full and perfect knowledge of the infinite wonders of the created world. Our philosophers of the loftiest intellects and of the largest attainments, need not, like Alexander, mourn that there is nothing left for them to conquer.

RELATIVE DATES OF VARIOUS INTRUSIVE ROCKS CUTTING THE LAURENTIAN SERIES IN CANADA.

BY SIR W. E. LOGAN, F. R. S.

Read before the Canadian Institute, December 12th, 1857.

In describing the distribution of the crystalline limestone bands of the Laurentian series of rocks, in previous Geological papers, it became necessary to allude to a large area of intrusive syenite. There are other igneous rocks, however, in the same district, and the relative dates of all that were observed are very well marked.

The oldest intrusive masses are a set of greenstone dykes, composed of a greenish white feldspar and black hornblende, with a small amount of iron pyrites. Their width varies from ten to one hundred yards, and they all possess a well marked transverse columnar structure. The largest are occasionally moderately coarse-grained, and the smaller fine-grained, but they are all distinctly crystalline. Their general bearing is east and west, but the main dykes occasionally divide, a branch striking off at an angle of from twenty to forty degrees.

These greenstone dykes being always cut off by the syenite where they have been observed to come in contact, it is plain the syenite must be of posterior date. The area which the syenite occupies has been elsewhere described. In its lithological character the rock is very uniform, being composed for the most part of feldspar, either of some tinge of red or a dull white, with black hornblende, and a rather sparing quantity of translucent quartz. The red tinge prevails more on the west side, the white on the east. In the spur

which runs into Wentworth, mica was occasionally found to accompany the hornblende. The rock was rather coarsely crystalline in the main body, but dykes of it, in which the grain was finer, were sometimes observed cutting the limestone and the gneiss. These, however, were never traced from any distance up to the nucleus.

The syenite was found to be cut and penetrated by volcanic rock of a porphyritic character, which is therefore of a still later date. The larger masses of this porphyritic rock consist of fine-grained dull reddish-buff feldspar, with which is mingled a sparing quantity of fine-grained black hornblende, the mixture constituting a base in which well-defined crystals of the same reddish feldspar, of various sizes, from one-eighth to three-eighths of an inch, are thickly disseminated; the base is compact, presenting an impalpable grain, a conchoidal fracture and a jaspoid aspect, with various colors, from light to dark gray, brownish-black, and dull green. In addition to crystals of red feldspar this jaspoid base often contains a multitude of fragments of gneiss, greenstone and syenite, varying in size from small grains to masses several feet in diameter, and these are occasionally so abundant as to give the rock the features of a tufa.

The principal mass of this porphyritic rock occupies a pear-shaped area of about 250 acres, with the small end south, on the third and fourth lots of the fifth and sixth ranges of Grenville, from which, on the east side, a portion is projected into the second lot of the fifth range. The mass is wholly surrounded by the syenite, and a large part of it constitutes a mountain or group of hills, intersected by one or two ravines. In about the centre of the mass, on the summit of one of the hills, there exists a circular depression of about one hundred yards in diameter, nearly surrounded by a tufaceous porphyritic rim of about thirty feet in height. In this depression—which is situated in the sixth range, on the line between the third and fourth lots, about fifteen chains from the front,—there is held a turf bog, with an even surface, from which springs a growth of good-sized greenwood trees; and on sounding the depth of this bog with a boring rod, the rock beneath was found to present the shape of a cup, with the depth of twenty-five feet in the centre, so that, including the rim, the depression would be about fifty feet deep, with the exception of a break down to the level of the bog, on the east side. The nature of the rock, and the difficulty of accounting for the depression by any mode of wearing, gives to it in some degree the air of a small volcanic crater. But if it were such, it must represent only the deeply-seated base of the crater, as the evidence which is

seen in the ice-grooves of the vicinity makes it probable the country has been much worn down by denuding agencies. In this vicinity some entangled beds of gneiss were met with, one of which was traced for upwards of a hundred yards, running about N 70° W. It was surrounded by the porphyritic rock.

From this porphyritic nucleus one or two porphyritic dykes were traced, cutting the syenite for short distances, and some of a similar character were met with at such a distance as to make it probable that there are other porphyritic nuclei.

In the vicinity of the pear-shaped porphyritic intrusion which was first described, there are met with two veins of a special character, cutting the syenite, that deserve to be noticed. They consist of cellular chert, from white to yellowish-brown, or flesh-red, the colors in some cases running in bands parallel to one another, and sometimes rather confusedly mingled, giving the aspect of a breccia. The cells are unequally distributed, some parts of the veins being nearly destitute of them, while in other parts they are very abundant, and of various sizes, from that of a pin's head to an inch in diameter. On the walls of some of these cells or druses, small transparent crystals of quartz are implanted, and in some there are the impressions of cubical forms, resulting probably from crystals of fluor-spar which have disappeared. On analysis, Mr. Hunt finds that the stone yields eight per cent. of soluble silica, and approaches in its composition to the nature of flint. From its cellular structure it would make a very good buhr stone.

The chief vein is on the land of Mr. Lowe. It appears to run in a very straight line, of which the bearing is about east and west, and it stands in a vertical attitude, while its breadth varies from four to seven feet, being apparently, however, in one place, nearly twenty. In the wider parts there are seen, in the middle of the vein, masses six or eight inches thick, of the syenite, which constitutes the wall rock. Where the rock is banded the colors run parallel with the sides. The attitude and associations of the mass clearly show that it cannot be of sedimentary origin, and the soluble silica which it contains, with the volcanic character of the district, suggest the probability of its derivation from hot springs similar to the Geysers of Iceland. Waters holding silica in solution have deposited this material upon the walls of crevices in the syenite, ultimately filling them up.

The intrusive rocks which have been described have a date anterior to the fossiliferous formations. None of a similar character have

been met with breaking through these formations, and the relations of the base of the lower silurian group, along the foot of the hills composed of the syenite, are such as to make it evident that the fossiliferous beds in some places over-lie worn down parts of the volcanic rock. But all these intrusive masses are cut by a set of dykes, whose relations to the fossiliferous strata are not so certain. These dykes are composed of a finely granular base, with an earthy fracture, consisting of feldspar and pyroxene, and having a dark brownish-grey color. In this base are imbedded rounded forms of black augite, giving brilliant cleavage surfaces, and varying in size from masses not bigger than a pin's head to some of several inches in diameter. These are associated with various sized nodules of calc-spar, filling cells that do not attain the diameter of the largest masses of augite, and with small spangles of mica, grey in fresh fractures, but weathering to a brass-yellow on the surfaces of slightly weathered cracks and joints. Small crystals of sphene were occasionally observed in the rock. In the nomenclature of d'Halloy the rock would be called a *melaphyre*, and is the *augite-porphyr*y of some German authors. By many geologists, from the accidental presence of the calc-spar nodules, it would be called an amygdaloidal trap.

These dykes bear a striking resemblance to some of those which intersect the lower silurian group in the vicinity of the mountain of Montreal, and may be possibly of the same age; but none of them have yet been traced continuously from the Laurentian into the fossiliferous rocks.

THE LECTURE ROOM, SMITHSONIAN INSTITUTION, WASHINGTON.

BY PROFESSOR HENRY, LL.D., WASHINGTON.

Read before the Canadian Institute, February 13th, 1858.

In the Eighth number of the *Canadian Journal* (Vol. II., p. 130) was published an admirable paper, by Professor Henry, Secretary of the Smithsonian Institution, on "Acoustics applied to public buildings." Through the kindness of the author, we are now enabled to present to our readers the accompanying diagrams in illustration of

the manner in which the principles and conditions investigated in that paper, have been practically carried out in the arrangements of the Lecture Room at Washington. The subject is so novel, and of so much importance, that we emphatically call the attention of architects and builders to this successful application of scientific research to purposes of public utility. We have only to add, that, from the accounts we have received, we believe that this first attempt to construct on scientific principles a room which shall fulfil the requirements of hearing has been entirely satisfactory. The following explanatory description by Professor Henry will be readily understood by reference to the article above mentioned. We need only further add that it will be observed, the practicable problem which had to be solved, was not the construction of the most perfect lecture room, in all respects, which the ascertained laws of acoustics, as applicable to public buildings, rendered possible; but the adaptation, by means of general principles previously ascertained, of some portion of a structure already completed, chiefly with a view to architectural effect, to the purposes of a theatre for public lectures.

The following is a brief description of the lecture room, which has been constructed in accordance with the facts and principles stated in Professor Henry's memoir on this subject, so far at least as they could be applied.

There was another object kept in view in the construction of this room besides the accurate hearing, namely, the distinct seeing. It was desirable that every person should have an opportunity of seeing the experiments which might be performed, as well as of hearing distinctly the explanation of them.

By a fortunate coincidence of principle, it happens that the arrangements for insuring unobstructed sight do not interfere with those necessary for distinct hearing.

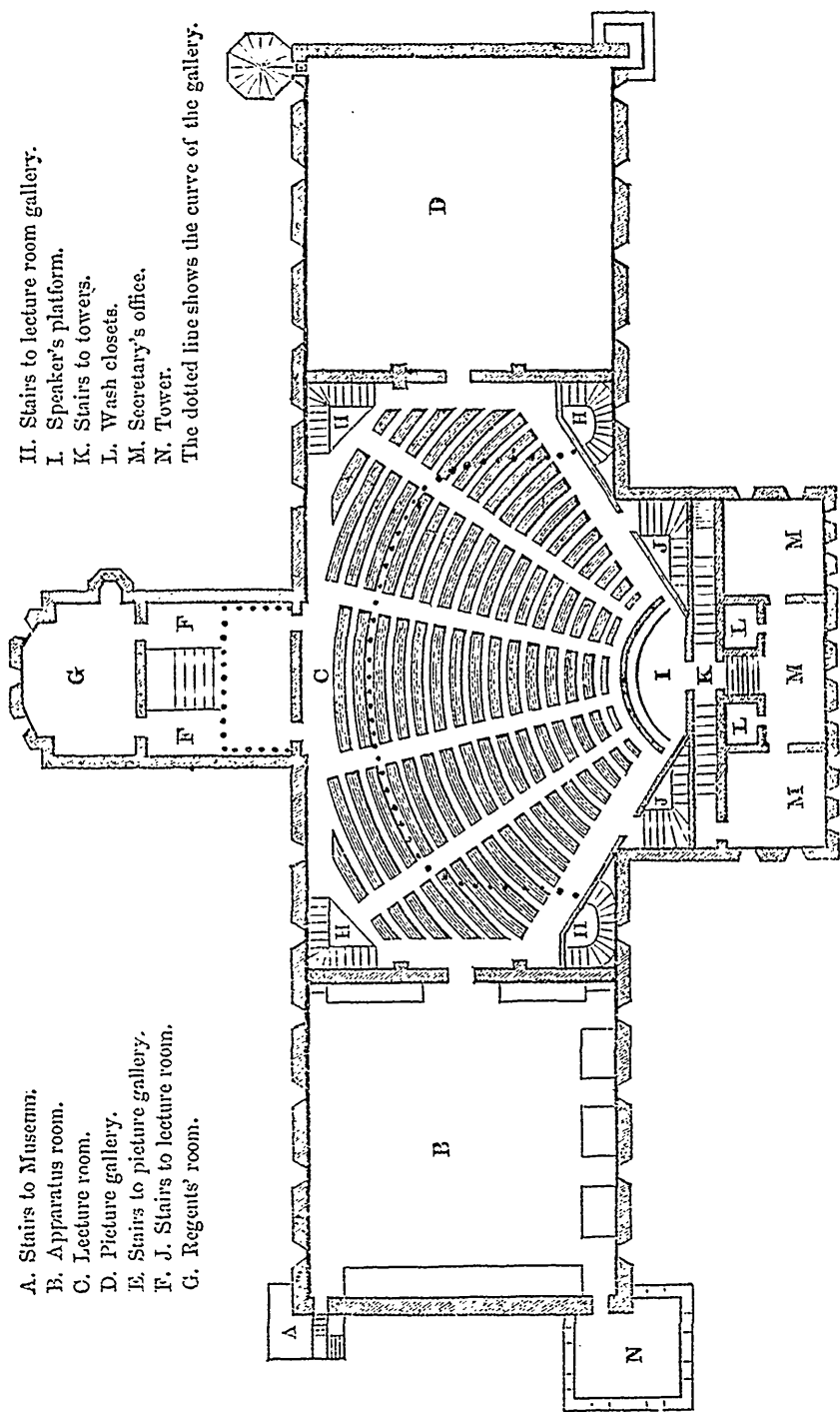
The law of Congress authorizing the establishment of the Smithsonian Institution directed that a lecture-room should be provided; and accordingly in the first plan one-half of the first story of the main building was devoted to this purpose. It was found, however, impossible to construct a room on acoustic principles in this part of the building, which was necessarily occupied by two rows of columns. The only suitable place which could be found was, therefore, on the second floor. The main building is two hundred feet long and fifty feet wide; but by placing the lecture-room in the middle of the story a greater width was obtained by means of the projecting towers.

The general form and arrangement of the room will be understood

- A. Stairs to Museum.
- B. Apparatus room.
- C. Lecture room.
- D. Picture gallery.
- E. Stairs to picture gallery.
- F. J. Stairs to lecture room.
- G. Regents' room.

- H. Stairs to lecture room gallery.
- I. Speaker's platform.
- K. Stairs to towers.
- L. Wash closets.
- M. Secretary's office.
- N. Tower.

The dotted line shows the curve of the gallery.



from the accompanying drawing, which exhibits a plan of the second story of the main building. In this, G, F, F, represent the rear, and M, M, M, the front towers. The lecture-room is 100 feet in its greater dimension, 64 feet from I to C, and 88 feet to the extremity of the upper gallery F, F. The curved dotted line represents the front of the gallery, which is in the form of a horse shoe. The dotted line in the rear tower represents the extension of the gallery into this space.

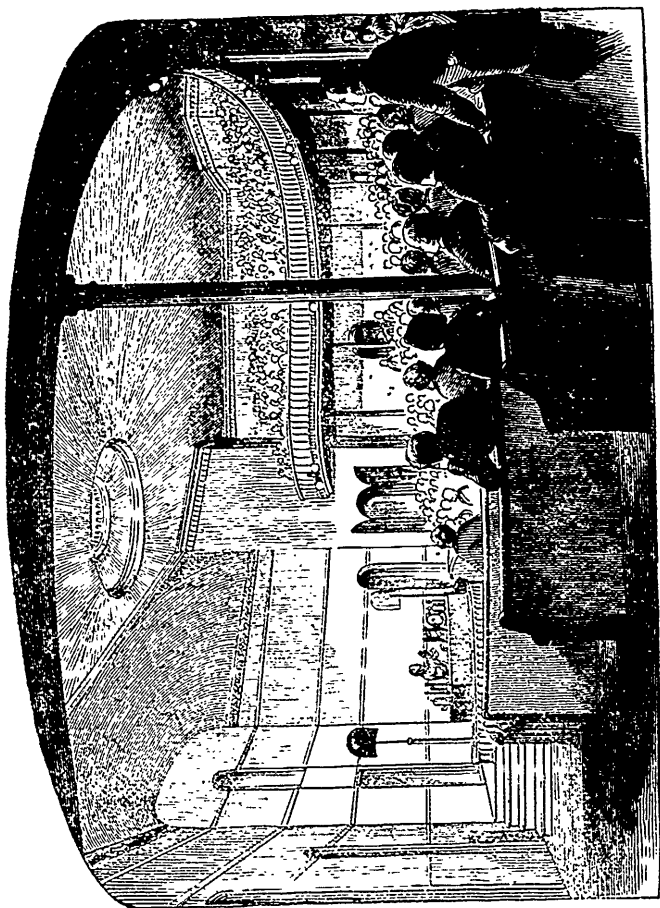
The second illustration exhibits a perspective view of the lecture-room from the west side under the gallery; and, when viewed along with the ground plan, shows better than any description could do, how well the second requisite has been accomplished: that every person should have an opportunity of seeing, as well as of hearing distinctly.

The speaker's platform is placed between two oblique walls. The corners of the room which are cut off by these walls afford recesses for the stairs into the galleries. The opposite corners are also partitioned off, so as to afford recesses for the same purpose. The ceiling is twenty-five feet high, and, therefore, within the limit of perceptibility. It is perfectly smooth and unbroken, with the exception of an oval opening nearly over the speaker's platform, through which light is admitted. The seats are arranged in curves, and were intended to rise in accordance with the *panoptic curve*, originally proposed by Professor Baché, which enables each individual to see over the head of the person immediately in front of him. The original form of the room, however, did not allow of this intention being fully realized, and therefore the rise is a little less than the curve would indicate.

The walls behind the speaker are composed of lath and plaster, and therefore have a tendency to give a more intense, though less prolonged sound than if of solid masonry. They are also arranged for exhibiting drawings to the best advantage.

The general appearance of the room is somewhat fan-shaped, and the speaker is placed as it were in the mouth of an immense trumpet. The sound directly from his voice, and that from reflection immediately behind him, is thrown forward upon the audience; and as the difference of distance travelled by the two rays is much within the limit of perceptibility, no confusion is produced by direct and reflected sound.

Again, on account of the oblique walls behind the speaker, and the multitude of surfaces, including the gallery, pillars, stair-screens, &c., as well as the audience, directly in front, all reverberation is stopped.



LECTURE ROOM, SMITHSONIAN INSTITUTION.

No echo is given off from the ceiling, for this is also within the limit of perceptibility, while it assists the hearing in the gallery by the reflection to that place of the oblique rays.

The architecture of this room is due to Captain Alexander, of the corps of topographical engineers. He fully appreciated all the principles of sound given by Professor Henry, as detailed in the former paper on "Acoustics applied to Public Buildings," and varied his plans until all the required conditions, as far as possible, were fulfilled.

LEGENDS AND TRADITIONS OF THE ODAHWAH INDIANS.

BY F. ASSIKINACK, A WARRIOR OF THE ODAHWAHS.*

Read before the Canadian Institute, December, 1857.

As it is my purpose to relate some Indian traditions, and make a few general observations concerning the Indian race of America, it may be proper to state that the Odahwah Indians are the tribe to which I myself belong. Some members of this tribe now reside on the Manitoulin Island in Lake Huron; others on the shores of Lake Michigan, in the State of the same name. The Odahwah settlement in that State is about forty miles in a south-westerly direction from the strait of Michinimakinang, which unites Lakes Michigan and Huron. That territory was wrested from the Mushkodensh tribe by the Odahwahs some two hundred and fifty years ago, and held by them until it was surrendered to the American government so recently

* Francis Assikinack, the author of this paper, is a full-blood Indian, and a son of one of the Chiefs of the Odahwahs,—or Ottawas, as they are more generally designated,—now settled on the Manitoulin Island in Lake Huron. In 1840, he was sent, at the age of sixteen, to Upper Canada College, Toronto, by the late Samuel P. Jarvis, Esq., then Superintendent-General of Indian affairs. At that time he was totally ignorant of the English language, and after being about three months at the above institution, he got one of the boys (now the Rev. G. A. Anderson of Tayeudinaga,) to interpret for him, and solicit permission to return home, as he thought he could never learn the English language. Fortunately his desire was not complied with, and he remained long enough at Upper Canada College, not only to acquire such a command of the English language as is evinced by this communication on the Legends and Traditions of his Tribe, but also to obtain a familiar knowledge of Latin and Greek. F. Assikinack now fills the office of Interpreter in the Indian Department at Cobourg. So creditable and satisfactory a result of an experiment which at first seemed so hopeless, ought surely to encourage its repetition, and that on a much more extended scale.

I believe as the year 1830. A few years after this surrender many of them commenced to emigrate to and reoccupy Manitoulin Island. Why they have preferred going to this place I shall endeavour to explain in a subsequent paper, when I have occasion to speak about the name of that Island.

Before proceeding with my subject, I feel bound to solicit the readers' kind forbearance for the many faults which will naturally arise, in the course of these statements, from my imperfect acquaintance with the English language.

With such knowledge as education has placed within my reach I have been tempted, at times, to indulge in speculations relative to the origin of our own portion of the human race spread over the face of this western world; and who were found in possession of its boundless forests on its discovery by men from the other side of the Atlantic more than three hundred years ago. But, omitting much which I had designed to say, I may be permitted to remark, that wandering Asiatic tribes crossing to the north-east of the old continent would at length reach the sea at Behring straits. Having reached East Cape, they could have no great difficulty in going over to the opposite shores; the channel which runs between that part of Asia and America being only about forty miles wide, and, with the exception of the accumulation of ice, or ice mountains sailing through it occasionally, I believe the dangers to be met with are not greater than those to be encountered in other similar bodies of water. Besides, I believe, there are geological proofs of violent earthquakes having altered the features of particular localities, the encroachments of the sea upon tracts of land, elevations of islands, &c.; it is not therefore altogether improbable that Asia and America were once contiguous. But a necessary purpose having been accomplished, a convulsion of nature, in course of time, might have torn and sunk the land which held the two continents together, and which had served as a bridge for the vast multitude of human beings who came to people this portion of the Globe, as well as for the innumerable quadrupeds which must have continued for year and years to invade the boundless tracts of the western hemisphere after the general deluge. Permit me further to remark that it would appear from the map of the world, besides minor ones, there were originally three most remarkable chains, if I may so speak, which united and held fast the grand divisions of the earth, two of which are still in existence, namely, the Isthmus of Panama, the Isthmus of Suez, and another across Behring Straits, which, it would

seem, was snapped and sunk for the purpose of affording greater conveniences to modern navigation and enterprize.

I think this was the principal road by which man and other creatures were brought into this continent, I do not of course mean that there were no other ways and means by which emigration into this country might have been effected; I have no doubt that America was visited from time to time long before this, by hunters and adventurers from the Asiatic coast.

It would appear then, according to the opinion which I have taken the liberty to offer, that my ancestors entered America on the north-western point, commonly known at the present day as "Russian America."

The reader will now be pleased to bear in mind, that the few simple statements which I am about to lay before him, are not taken from information obtained by reading, but entirely from what I have learned casually from the Indians themselves in my younger days, when, I regret to say, I was in no way particularly anxious to obtain information. Neither had I the least idea of what use could be made of the old "Ahsokah nayahk," or legends. In the following narrative I shall confine myself to the traditions of my own people, viz.: the Odahwah Indians. It would appear, that in the earliest times to which it is possible to reach by tradition, this vast territory was inhabited by a race of men, said to be descended from one common stock, who were divided into tribes, each being independent and ruling over its own particular district. Living by the chase and on the spontaneous productions of the soil: we may nevertheless suppose, from their mentioning wooden hoes and corn cakes, that they also cultivated the soil to some extent. To give an idea how numerous the tribes were I shall name here a few, viz.: The Wahbahnahkiang, Nodoweg, Odushkwahguhmgig, Assigahnayak, Obahnongoog, Omisahgig, Ojahwahnoog, Omahmeeg, Odahgahmeeg, Odahwahg, Ojibwag, Mushkodenshug, Omahnomineeg, Winibigoog, Osahgeeg, Podawahdahmeeg, Kigahboog, Nahdowassiwahg, Nabahgindibag, Oshushug, Kahshkahshkiang, Ahkewawigiwashmahg, Mahkahdaonahsahdahyang, Tchiboyahnug, and others, which I think it would require an extra sheet to enumerate. Each of these tribes had to maintain a small sovereignty of its own and for its own use. The members of the neighbouring tribes had no right to go beyond the limits of their respective districts on their hunting excursions, and encroach upon that belonging to others. Any hunter that was caught trespassing upon the rights of other tribes, or taking beaver in the rivers running through their lands,

was in danger of forfeiting his life on the spot for his rashness, and had much to do to elude his pursuers, if he was fortunate enough to escape their deadly weapons in the first hostile encounter. Things went on in this manner until the several states were obliged to declare open hostilities against each other in order to protect their rights the better. From this time they were engaged in constant warfare, more particularly against their immediate neighbours. The Indians say, this warlike attitude among the various tribes in the old times was occasioned rather by the force of circumstances than by the mere love of slaughter or warlike enterprise; that it was not altogether a war of extermination or conquest, and it would appear from their statements that the practice of carrying on cruel exterminating wars was adopted after the discovery of America by the Europeans. In fact, it was introduced by them, and great care was taken in their treaties with the Indians to induce them to adopt this sanguinary policy as a punishment to be inflicted upon any offending tribe. The Omahmee Indians in the vicinity of Omahmee River, on the coast of Lake Erie, were subjected to this severity, because they had ill-treated some traders, and at the instigation of the French they were attacked by several tribes. Although single handed the poor brave fellows held out for three months; yet, being then reduced to great straits by famine and by overwhelming numbers, the few survivors of that once powerful tribe came out and begged the besiegers not to devour the whole of the Omahmee nation. It is said, that out of the whole tribe only five families escaped this indiscriminate slaughter. The warfare then in which the Indian tribes were constantly engaged previous to the discovery of America in the fifteenth century, was begun and carried on for the sake of self-preservation. For such a state of things was considered necessary, inasmuch as a universal peace would have given too much liberty to the hunters, who would have overrun the country and in a short time killed off the animals, upon which the whole population depended for their chief subsistence and clothing. But the keeping up of hostilities by the various tribes against one another had the desired effect of preventing trespass upon their rights respectively, and causing their respective members to avoid as much as possible the frontiers for fear of meeting an enemy. The borders being thus left unmolested by the restless hunter, they were looked upon as neutral grounds, where the animals might resort and breed freely, whence the neighbouring districts might be supplied with game in abundance for the use of the inhabitants.

These are the reasons assigned by tradition for the continual wars

carried on among the Indian tribes in the early times. By the way, it is curious to notice, that tribes whose territories were far separated from one another were, in many instances, upon the best possible terms.

Generally speaking it may be said that the inhabitants dwelt in villages, and their favorite seats appear to have been eminences on the borders of lakes, and along the banks of rivers, so that in case of a hostile invasion they would have only one side of their village to defend and not be cut off from the supply of water. The villages of contending tribes were often within sight of each other. Notwithstanding the precaution to prevent their being surrounded, the villagers were often obliged to meet the enemy on the water in their canoes, made of elm bark or hide; and they thought as much of their naval engagements and victories as the navy of England of their achievements at the present day. It was customary to give a new name to the warrior who had distinguished himself most in their naval battles, as an honor and reward for his daring deeds, and to commemorate the event.

We have already noticed how the inhabitants were divided into tribes; and I may here state that a tribe was again subdivided into sections or families according to their "Ododams;" that is their devices, signs, or what may be called according to the usage of civilized communities, "Coats of Arms." The members of a particular family kept themselves distinct, at least nominally, from the other members of the tribe; and in their large villages, all people claiming to belong to the same Ododam or sign, were required to dwell in that section of the village set apart for them specially, which, from the mention of gates, we may suppose, was enclosed by pickets or some sort of fence. At the principal entrance into this enclosure, there was the figure of an animal or some other sign, set up on the top of one of the posts. By means of this sign every body might know to what particular family the inhabitants of that quarter claimed to belong. For instance, those whose Ododam was the bear would set up the figure of that animal at their principal gate. Some of the families were called after their Ododam. For example: those who had the gull for their ododam, were called the gull family, or simply the Gulls; they would of course put up the figure of that bird at their gate. Others did not adopt this custom; for instance, the family who set up the bear were called the "Big feet." Many of the village gates must have been adorned with very curious carvings, in consequence of parts only of different animals being frequently joined together to make up the ensigns armorial of a

family. For instance, the ododam of one particular section consisted of the wing of a small hawk and the fins of a sturgeon.

Some of the families were more influential than others, and it was necessary to obtain their consent before a council could be convened in which matters of importance were to be discussed. Others again were distinguished for their bravery or eloquence, and not a few for their filibustering propensities. There was one head chief recognized by the whole tribe, but his authority was merely nominal, the several families being placed under the authority and supervision of their respective chiefs. It was expected of a chief, that in order to maintain the dignity of his office and secure the respect and confidence of his people, he should be generous, brave, able to speak well, and avoid foolish talking; but above all, to have no feelings for himself—people might abuse him and say many things against him, but it was thought beneath his dignity to take any notice of what they said. This is the substance of the instructions given by an old chief when he resigned in favor of his son or some younger relative of his. There were two sorts of chiefs, namely, the war chiefs, and what may be called the civil chiefs, the former possessed a greater influence than the latter, and were really brave men, judiciously selected from the different families. In ordinary times the civil chiefs were left to manage the affairs of the tribe, but on extraordinary occasions the war chiefs were required to assist the other chiefs and exercise their influence. For instance, in matters of dispute with another tribe, which were likely to end in breaking off the friendly relations between the two tribes, if not satisfactorily arranged, it was, in the first place, the duty of the civil chiefs to use their best endeavors to settle the matter in dispute amicably, but if the other tribe persisted in refusing to listen to any reasonable terms, the matter was handed over to the war chiefs for decision, who at once met in council, selected a few of their number and sent them to the obstinate tribe to demand peace or war. If the deputation returned with words of peace, all was right; but if otherwise, all friendly intercourse ceased, and each prepared for war; and, if I recollect right, it was customary to permit the women, in cases of intermarriage, to return to their own tribe, if they wished to do so.

Having said this much about the social conditions of the Indian tribes and their relations one towards another in the early times, I shall now endeavor to give a brief account of their notions concerning the supernatural world, or what may be called their mythology, and relate some fragments of old legends, in which, I think, there are a few grains of truth to be found relating to the great events recorded

in sacred history. Here I would take the liberty to remark that, historians seem to think that the old legends of a nation, however fanciful and absurd they may appear to us, are by no means devoid of truth and that we ought not to throw them aside as useless fictions, without examining them closely first, to see if we cannot discover some historical truth therein, as it is only by means of traditions and legends that the early history of a nation can be divined.

Notwithstanding the belief of the Indians of America in the existence of many gods, they acknowledge but one Supreme Being. They believe this Supreme God to be all powerful, all knowing, infinitely perfect and invisible. So far as it is possible to ascertain by verbal information as furnished by the Indians themselves in this part of America, this Supreme Being was never represented under any corporeal figure. The idea that he was subject to any imperfection appears never to have entered into their heads; and He was supposed to preside over the whole world, nothing escaping his eye. From this it is evident that their notion of the Supreme Being was far superior to that of the ancient Romans and Greeks, respecting their Jupiter and Zeus, whom their poets did not hesitate to represent as beings subject to all the passions and frailties of human nature.

It is true that the Indians sometimes introduced the name of the Lord of the Universe into their war songs. They did so, not with levity, but in a solemn manner and in token of their submission to His will, whatever might happen to them in the warlike enterprise in which they were about to engage.

I think they had a pretty correct idea of the doctrine of Omnipresence, for they were careful to impress upon the minds of their children that the Great Spirit was above their heads, watching over them continually; and in order to have them properly instructed in their duties towards their parents and neighbors, a certain number of discreet aged people were selected to exhort the children in the evening. To the residences of these instructors the children repaired after their work was done, where they received good counsel and caution against doing evil. They were made to understand that however careful they might be to avoid suspicion or detection when doing injury to a neighbor, the Great Spirit would see all their actions, who was always near them. That if they incurred his displeasure, they had no right to expect any favors from him, as He withheld his good gifts from those who took delight in creating discord by calumny, and in tormenting others by means of jugglery and poisonous weeds. That they were to respect and obey their parents, that they might put to shame the evil spirit

who was always at hand tempting children to disobey and vex their parents, and who, whenever he succeeded in his wicked endeavors made all sorts of faces to them, though they did not see him, rejoicing for having gained victory over them ; but as often as they resisted him successfully, he went away skulking, covered with shame and confusion, whilst the Great Spirit was pleased.

The children were also taught to show respect to old people ; that as it was not in the power of man to prolong his life, it was by special favor that some people lived longer than others ; that if such cursed those who despised and illtreated them in their old age, their petition would be heard by the Absolute Master of life ; on the contrary their good wishes would be attended with happy results.

As regards the inferior divinities : some were supposed to dwell in the sky and clouds, some in mountains, and others in lakes, rivers, and in the subterranean passages which were said to lead from the deep parts of lakes into the bowels of the earth. Some of these inhabiting the watery caverns were supposed to be extremely malicious, always seeking to destroy the human beings who might happen to be on the water in the time of storms, instead of protecting them.

The Thunders, conscious of their irresistible strength, were considered to be generous, always ready to afford their strong protection to mankind ; consequently the dreadful water monsters, and the terrible gods in the clouds were represented to be at perpetual enmity. The Thunders, of course, by fiery darts, always vanquished their opponents in the water, but they had to slay them eight times before they could finally kill them. If any person was killed by lightning it was said to be merely accidental, seeing that when the hideous monsters in the earth and water were roared and hotly pursued, they usually took refuge and hid themselves in the subterranean passages directly under the spot inhabited by men, and in their endeavors to dislodge them, the Thunders missed sometimes their aim and thus struck their own friends. When overtaken by a hurricane in the water, the Indians invoked some sea god to interfere in their behalf, throwing a piece of tobacco into the water at the same time, or a little dog with a stone tied to its neck. In dry seasons they called upon the Thunders to bring down rain ; also when they were surrounded and reduced to great straits in war, that the rain might slacken the bow strings and render them useless, when of course both parties would be obliged to cease fighting.

To the Thunders and other inferior deities they occasionally offered sacrifices, but instead of consuming the victim by fire or otherwise

wasting it, they cooked or roasted and devoured the animal themselves, singing, dancing, and beating the drum during the feast.

The following are a few fragments of Indian legends. Although they do not appear to have had any distinct notion of the creation, still their idea of the dignity of human nature seems to have been higher than that entertained by those ancient and modern philosophers who would have us believe that the lowest state of barbarism was the primitive condition of man ; that the first human beings sprung, in the condition of mere animals, from the earth, going about upon their hands and feet: mute, filthy, acorn-eating savages, until from constant fighting, scratching and what not, they learned to stand erect, and walked upon their feet. So far from there having been any such notion among the Odahwahs, Ojibways and their neighbors, tradition told them that the first human beings came from above, which is certainly not altogether at variance with the Bible doctrine regarding the origin of man.

As regards the flood, the story runs as follows: A celebrated demigod came to reside with men for some time. He is styled Nanah-boozho, and possessed the power of doing wonders. In the course of his stay with men, he one time fixed his winter-quarters near a certain lake ; but he was not long there before he became aware that malignant monsters dwelt in the lake. He therefore carefully cautioned his favorite son, Wolf, not to go upon the ice lest some misfortune happen to him ; but told him always to come by land when returning from his hunting rounds. The young Wolf acted for some time upon the advice of his sire, until one evening as he was returning from the chase, he reached the margin of the fatal lake, directly opposite his father's camp ; and being much fatigued and hungry, and it being very late in the evening, he thought it would be too much trouble, and take too long to go round by land, so after a few moments hesitation he ventured upon the ice and made for the opposite shores ; but when he got about half way, he heard a rumbling noise and the ice began to be elevated in different parts of the lake. The young hunter being terrified, ran for his life ; but before he reached the land, death overtook him amid the broken fragments of ice, and he found his grave beneath the waters.

The father being deeply grieved for the loss of his favorite son, vowed vengeance upon the destroyers of his life, and determined to watch for a favorable opportunity during the hot days of the ensuing summer, when the cruel monsters would emerge occasionally from their dismal abode in the deep to come and enjoy the sunshine upon

the sandy beach. Snow and ice disappeared. Warm weather came. When the proper time arrived, the father took his bow and quiver one fine morning, and repaired to the lake. Having chosen a convenient spot near the sandy beach, he there took up his position, and in order to avoid detection, transformed himself into an old pine tree scorched all over. About noon the sea gods appeared on the surface, and after having carefully surveyed their pleasure ground and its vicinity, and perceiving no danger, swam towards the shore, landed, and reclined upon the sand. But not being used to sunshine, they were soon overpowered by the heat, and fell into a deep sleep. The father had now the power of inflicting a deadly wound upon any of them, so he quietly bent his bow, took a deliberate aim, and let fly his flint-pointed arrow into the side of one of the slumbering monsters.

The water deities being thus startled from their pleasant repose, and finding one of their compeers terribly wounded, were driven in their rage beyond all bounds. They immediately plunged into the deep and commenced to agitate the waters, which soon overflowed the banks of the lake, sending forth floods in all directions, sweeping everything before them, until the whole earth was buried under water. In the meantime, Nanahboozho perceiving his perilous situation, took refuge on the highest point of the earth, but the flood came up to him rapidly; he then got upon a pine log that was floating by, being the only means within his reach by which he could save himself from immediate destruction. Sitting upon this log he was driven and tossed about by the fury of the elements until at length they exhausted their rage, then the waters became still.

As soon as the fair weather commenced, Nanahboozho took into his consideration various schemes by which he might be enabled to recover the lost world. Whilst meditating deeply, he happened to notice a muskrat that was on his log canoe, he forthwith commanded the animal to dive and endeavor to bring up a piece of mud from the bottom. The muskrat plunged at once into the water and went down; after a long time he came up to the surface apparently dead. His master took him up, and on examining the arms of the animal, he found a lump of clay under one of the shoulders; this lump he pressed between his hands, and when he made it very thin, he carefully placed it upon the surface of the water. This piece of mud became a large island in the course of a few days, which continued to increase until the earth was formed as we have it now. The new earth again became the habitation of human beings, covered with luxuriant verdure, and furnished with other necessaries for the use of man and

other animals. It is remarked that the surface of the new earth was perfectly level in its commencement, but, in the course of its formation, an enormous beast arose from the ocean, and came upon the land where he began to paw and otherwise disfigure the surface. The earth being then quite soft, he made lasting impressions, hence we have mountains and deep vallies. Nanahboozho is said to have been of a gigantic stature; of a happy and kind disposition. He continued to reside with men for some time after the flood, the great part of his time being employed in instructing them in the use of many things necessary for their well-being. He then told them that he was going away from them; that he would fix his permanent residence in the north, and that he would never cease to take deep interest in their welfare. As a proof of his regard for mankind, he assured them that he would from time to time raise a large fire, the reflection of which should be visible to them. Hence the northern lights are regarded by the Indians as the reflection of the great fire kindled occasionally for the purpose of reminding them of the assurances made to them by their benefactor.

With regard to the unity and dispersion of the human race. The Indians appear also to have had some notions of their own on the subject. The story is short and simple, but sufficiently clear in its own way; and, I may observe, nearly the same story is current with almost every tribe. It is as follows:—

The tribes were one and the same people in the beginning; but at a certain point of time, their ancestors had a great dispute. The cause of that dispute was the foot of a bear, and when they could not make up their differences, they quietly dispersed in different directions, and their children became distinct nations under different names.

One more legend, and I shall close my present writing. It is usually told nearly as follows, viz. :—Several brothers, or a body of men of the tribe, were being pursued and hard pressed by fierce enemies, and being driven to the ends of the earth, when it was impossible for them to retreat any further, one of them suddenly turned round and struck the earth with his stick, which immediately opening, all their pursuers were swallowed up in the yawning abyss, the earth closed again, and thus saved his companions from death.

This legend, heard by me in childhood, has almost entirely escaped my memory since, and I can only relate the substance of it. I have sometimes thought of it in after times, and wondered whether it might not possibly be a tradition, giving an Indian account of the tribes of the Israelites when overtaken by the pursuing armies of Pharaoh, and the drowning of the Egyptians by the waters of the Red Sea.

ON THE ACTION OF AIR ON ALKALIC ARSENITES.

BY HENRY CROFT, D.C.L.,
PROFESSOR OF CHEMISTRY, UNIVERSITY COLLEGE, TORONTO.

Read before the Canadian Institute, January, 1858.

It is well known that a solution of arsenite of soda has been employed of late years as an important agent in volumetric analysis, especially in the determination of the value of chloride of lime. Fresenius (Chemical Gazette, No. 300,) has objected to this process, that the alkalic arsenite when in solution is liable to oxidation, and that by exposure to the air a notable quantity of the arseniate is formed, which of course interferes with the accuracy of the volumetric determination.

He states that a freshly prepared solution of arsenite of soda gives the usual pale yellow precipitate with nitrate of silver, but that with a solution which has been exposed for some time, a precipitate having a brown tinge is obtained, and he affirms that nearly the whole of the arsenious acid is converted into arsenic in the course of three weeks, if the bottle in which the alkalic solution is contained be opened rather frequently. He also detected the presence of arseniate in Fowler's solution, a fact which is of some importance in a medicinal point of view.

On the other hand, Mohr, (to whom we are indebted for most important improvements in this very elegant branch of chemical analysis,) denies the oxidation of the liquor arsenicalis, and also of the arsenite of soda in presence of excess of carbonate, and by volumetric experiments with a solution of the arsenite mixed with starch and a normal solution of iodine in iodide of potassium, he proved that no change had taken place in a solution which had been kept ten months. He states that this latter solution gave, with nitrate of silver, a pure canary yellow precipitate, without any admixture of brown.

The following experiments, without fully clearing up the difficulty, at least exhibit one of the causes of the discrepancies in the statements of the above mentioned eminent chemists.

The formation of a pure canary yellow coloured precipitate in a solution of an alkalic arsenite, is no proof that an arseniate is not present. If 99 parts of arsenious acid be mixed with 1 part of arsenic acid, and dissolved in potassa, the solution carefully neutralized with

acetic acid and then tested with nitrate of silver, a pure yellow precipitate is produced without a trace of brown, and the same is the case if the amount of arsenic acid be increased even to five per cent. Beyond that quantity the brownish red tint becomes perceptible.

But if to the solution in which the yellow precipitate has been formed, very dilute nitric acid be cautiously added, drop by drop, the arsenite of silver being more readily soluble in nitric acid than the arseniate, will dissolve first, and leave the latter with its characteristic color. The smallest excess of nitric acid, however, dissolves the arseniate and destroys the experiment. By adding ammonia and again trying the nitric acid we can almost always succeed in producing the red color. That the nitric acid employed in the process exerts no oxidizing action on the arsenious acid is easily proved by using a pure arsenite, when no trace of brown coloration can be obtained.

Instead of nitric acid we may employ acetic, in which the arsenite of silver is readily soluble, but the arseniate quite or nearly insoluble. With either acid, however, it is somewhat difficult to detect the presence of the arsenic acid when it does not amount to more than one per cent. When ten per cent. of arseniate is present the brownish red color is produced immediately; with seven per cent. the color is fainter, and with five per cent. the precipitate is so nearly pure yellow that no safe conclusions can be drawn as to the presence of arsenic acid from the color alone.

Solutions of equal quantities of arsenious acid in potassa, carbonate and bicarbonate of potassa, carbonate of soda, bicarbonate and caustic soda, were prepared twelve months ago, with a view to some experiments on this subject, but have remained untouched until the present time, the last two being unfortunately lost. They were all freely exposed to the air, but in neither of the first four cases could any brown coloration be detected on neutralizing with acetic acid, and precipitating by nitrate of silver. In all of them, however, the arseniate was readily detected by the process above described, thus confirming, as might have been expected, the results of that most accurate analyst, Fresenius.

While the oxidation of the arsenious acid was thus clearly proved, the amount converted into arsenic acid was found to be exceedingly small, and what is most remarkable is, that the solution in bicarbonate of potassa showed a much larger proportion of arseniate than either of the others, but in no case was the quantity very large, herein differing from Fresenius' experiments.

The following experiments were made with the view of confirming Fresenius' statement with regard to the rapid oxidation of arsenite of soda :

Equal quantities of arsenious acid were dissolved in potassa, soda, and their bicarbonates, the latter being used in excess. After free exposure to the air for three weeks it was found that all the solutions gave a pure canary yellow precipitate with nitrate of silver, but that in the case of the soda solution the presence of an appreciable quantity of arseniate could be detected by using nitric or acetic acid in the manner above mentioned. The potassa solution gave an exceedingly faint, almost imperceptible, trace of arseniate; and the same was the case with the bicarbonate solutions. Portions of these liquids which had been kept in close stoppered bottles gave of course no indication of arseniate. From comparative experiments the quantity of arseniate in the soda solution was estimated at between two and three per cent., a result which differs most unaccountably from that obtained by Fresenius.

From these experiments it would appear that, contrary to Mohr's statements, oxidation does take place in solutions of alkalie arsenites exposed to the air, but that the amount of oxidation is in most cases so small as not to interfere with the employment of such solutions in accurate volumetric experiments, unless under such abnormal and unknown conditions as apparently occurred in Fresenius' experiments.

It would seem therefore advisable in preparing solutions for such purposes to adopt Mohr's suggestion, viz., to acidulate the arsenite of soda solution with sulphuric acid, and then to dilute to one litre (or other measure), and before using the solution to supersaturate with carbonate of soda. All oxidation would thus be prevented, as free arsenious acid in solution does not pass into arsenic acid. A solution which had been very frequently exposed to the air for the last six years, showed no trace of the latter.

From experiments made since the above was written it would appear that the use of acetic acid in this mode of testing is far preferable to nitric acid, the least excess of which dissolves the arseniate. If a considerable excess of acetic acid, containing about twenty per cent., be added to the precipitate, the arsenite dissolves, and the arseniate separates as a light flocculent matter on the surface, exhibiting very distinctly the brown color. In this manner less than one per cent. can be readily detected. Experiments made on some of Fowler's solution, which had been kept two months, discovered slight traces of arseniate. It would be interesting to ascertain under what circumstances Fresenius' experiments were made; in the above, in which so very little oxidation took place, the solutions in potash and soda were made as neutral as possible.

R E V I E W S .

The Englishwoman in America. London: John Murray, 1856.

This pleasantly written sketch of an Englishwoman's first impressions of British North America and the United States, has lain by us, for the purpose of review, till it has almost fallen out of date. The book is a good book, however; candid and vivacious, and containing some glimpses of things as they they are, which may still be worth noticing for behoof of Canadian readers. In her prefatory remarks our travelling "Englishwoman" observes:

"Previously to visiting the United States, I had read most of the American travels which had been published; yet, from experience, I can say that even those who read most on the Americans know little of them, from the disposition which leads travellers to seize and dwell upon the ludicrous points which continually present themselves.

"We know that there is a vast continent across the Atlantic, first discovered by a Genoese sailing under the Spanish flag, and that for many years past it has swallowed up thousands of the hardiest of our population. Although our feelings are not particularly fraternal, we give the people inhabiting this continent the national cognomen of '*Brother Jonathan*,' while we name individuals '*Yankees*.' We know that they are famous for smoking, spitting, 'gouging,' and bowie knives; for monster hotels, steamboat explosions, railway collisions, and repudiated debts. It is believed also that this nation is renowned for keeping three millions of Africans in slavery; for wooden nutmegs, paper money, and 'fillibuster' expeditions.

"I went to the States with that amount of prejudice which seems the birthright of every English person, but I found that, under a knowledge of the Americans which can be attained by a traveller mixing in society in every grade, these prejudices gradually melted away. I found much that is worthy of commendation, even of imitation."

We detect, as might naturally be looked for under such circumstances, an occasional exaggeration of unprejudiced candor, and a tendency to regard all that pertains to the States as *couleur de rose*,—very pardonable in a lady traveller, who met with great kindness, and saw much which justly excited her surprise and admiration. We had marked various passages for quotation, illustrative of the aspect in which American society presents itself, under the most favorable circumstances, to an intelligent foreigner; but having been delayed in noticing the work, we shall limit our extracts chiefly to one or two glimpses of ourselves, showing how Colonial life and social manners pass under review, when candidly compared by a travelling "Englishwoman," alike with her own home experiences, and with what she

observed both in the old and the new States of the Union. And here is a lively and piquant illustration of the vein of humour with which the graphic pen of our authoress sketches off some of those racy encounters which every traveller in the New World must occasionally experience. As it is a sketch of British Colonial life and enterprise, it may serve as a taste of that species of traveller's tales, respecting ourselves, which has excited so much ire when applied to our neighbours across the border.

I cannot forbear giving a conversation which took place at a meal at this Inn, [The Waverly House, St. John, New Brunswick,] as it is very characteristic of the style of persons whom one continually meets with in travelling in these Colonies. 'I guess you're from the Old Country?' commenced my *vis-à-vis*; to which recognition of my nationality I humbly bowed. 'What do you think of us here down east?' 'I have been so short a time in these provinces, that I cannot form any just opinion.' 'Oh, but you must have formed some; we like to know what Old Country folks think of us.' Thus asked, I could not avoid making some reply, and said, 'I think there is a great want of systematic enterprise in these colonies; you do not avail yourselves of the great natural advantages which you possess.' 'Well, the fact is, old father Jackey Bull ought to help us, or let us go off on our own hook right entirely.' 'You have responsible government, and, to use your own phrase, you are on your own hook in all but the name.' 'Well, I guess as we are; *we're a long chalk above the Yankees*. Though them is fellers as thinks nobody's got their eye teeth cut but themselves.'

The self-complacent ignorance with which this remark was made was ludicrous in the extreme. He began again. "What do you think of Nova Scotia and the 'Blue Noses?' Halifax is a grand place, surely!" "At Halifax I found the best inn such a one as no respectable American would condescend to sleep at, and a town of shingles, with scarcely any side walks. The people were talking largely of railways and steamers, yet I travelled by the mail to Truro and Pictou in a conveyance that would scarcely have been tolerated in England two centuries ago. The people of Halifax possess the finest harbour in North America, yet they have no docks and scarcely any shipping. The Nova Scotians, it is known, have iron, coal, slate, limestone, and freestone, and their shores swarm with fish, yet they spend their time in talking about railways, docks, and the House of Assembly, and end by walking about doing nothing."

"Yes," chimed in a Boston sea-captain, who had been our fellow-passenger from Europe, and prided himself for being a "thorough-going down-easter." "It takes as long for a Blue Nose to put on his hat as for one of our free and enlightened citizens to go from Bosting to New Orleans. If we don't whip all creation it's a pity! Why, stranger, if you were to go to Connecticut and tell 'em what you've been telling this 'eer child, they'd guess you'd been with *Colonel Crockett*."

"Well," I proceeded, in answer to another question from the New-Brunswickier, "if you wish to go to the north of your province, you require to go round Nova Scotia by sea. I understand that a railway to the Bay of Chaleur has been talked about, but I suppose it has ended where it began; and for want of a railway to Halifax, even the Canadian traffic has been diverted to Portland."

"We want to invest some of our surplus revenue," said the Captain. "It will be a good spec when Congress buys these colonies; some of our ten-horse power chaps will come down, and before you could whistle 'Yankee Doodle,' we'll have a caual to Bay Varte, with a town as big as Newhaven at each end. The Blue Noses will look kinder streaked then, I guess."

Our observant traveller visits in succession, the various British American Colonies, and while she sees much to admire and wonder at, in the evidence of enterprise and rapid progress, she also repeatedly finds occasion to draw comparisons between the eastern Colonies and the neighbouring States, not always very favorable to the former. She exhibits, indeed,—as an Englishwoman speaking of British Colonies,—some of that candor which a friend occasionally claims the liberty to indulge in: giving expression to truths more wholesome than pleasant, and relieving her mind thereby of some of the pent-up spirit of critical observation, which she has discovered might not be very well received by her American friends. Some of her colonial comments are certainly sufficiently plain spoken. After commending the summer beauty of Prince Edward Island, "The garden of British America," its highly favored climate, good wages, abundant employment, land cheap yet productive, wood plentiful, and the main occupation of the Islanders: ship-building, a most profitable trade; the reverse follows, in such an over-drawn picture of "the dull, cheerless, desolate winter," as the unexperienced invariably associate with our Canadian frosts and snows. We shall condense one or two of her piquant pencillings of Prince Edward Island:

Charlotte Town, the capital of the Island, and the Seat of Government, is very prettily situated on a capacious harbor. With the exception of Quebec it is considered the prettiest town in British America; but while Quebec is a city built on a rock, Charlotte Town closely borders upon a marsh, and its drainage has been very much neglected. . . . The houses are small, and the stores by no means pretentious. The streets are unlighted, and destitute of side-walks; there is not an attempt at paving, and the grips across them are something fearful. 'Hold on' is a caution as frequently given as absolutely necessary. I have travelled over miles of corduroy road in a springless waggon, and in a lumber waggon drawn by oxen where there was no road at all, but I never experienced anything like the merciless, joint-dislocating jolting which I met with in Charlotte Town. This island Metropolis has two or three weekly papers of opposite sides in politics, *which vie with each other in gross personalities and scurrilous abuse.*

. . . . The House of Assembly is said to be on a par with Irish poor-law guardian meetings for low personalities and vehement vituperation.

The genius of discord must look complacently on this land. Politics have been a fruitful source of quarrels, misrepresentation, alienation, and division. The opposition parties are locally designated *snatchers* and *snarlers*, and no love is lost between th two. It is broadly affirmed that half the people on the island

do not speak to the other half. And worse than all, religious differences have been brought up as engines wherewith to wreak political animosities. I never saw a community in which people appeared to hate each other so cordially.

. . . . The further you go from Charlotte Town the more primitive and hospitable the people become. They warmly welcome a stranger, and seem happy, moral, and contented. . . . The difficulty in procuring servants is felt from the Government House downward. A servant left at an hour's notice, saying, 'she had never been so insulted before,' because her master requested her to put on shoes when she waited at table; and a gentleman was obliged to lie in bed because his servant had taken all his shirts to the wash, and had left them while she went to a 'frolic' with her lover.

The upper class of society in the island is rather exclusive, but it is difficult to say what qualification entitles a man to be received into 'Society.' The *entrée* at Government House is not sufficient; but a uniform is powerful, and wealth is omnipotent.

We wonder if any able editor of Charlotte Town has, as yet, availed himself of the opportunity of reviewing this highly flattering picture of himself, his brother editors, the Prince Edward citizens and their Metropolis, presented by our fair traveller to the world at large. If so, a peep at his style of treating the theme would not be without a certain spice of interest. But we must follow our enterprising observer to our Western Colonial settlements, accompanying her in her short cut through the States, where the following may serve as a sample of her experience in the cars:

"'You're from down east, I guess?' said a sharp nasal voice behind me. This was a supposition first made in the Portland cars, when I was at a loss to know what distinguishing and palpable peculiarity marked me as a 'down easter.' Better informed now, I replied, 'I am.' 'Going west?' 'Yes.' 'Travelling alone?' 'No.' 'Was you raised down east?' 'No, in the Old Country.' 'In the little old Island? Well, you are kinder glad to leave it, I guess? Are you a widow?' 'No.' 'Are you travelling on business?' 'No.' 'What business do you follow?' 'None.' 'Well, now, what are you travelling for?' 'Health and pleasure.' 'Well, now, I guess you're pretty considerable rich. Coming to settle out west, I suppose?' 'No, I'm going back at the end of the fall.' 'Well, now, if that's not a pretty tough hickory-nut! I guess you Britishers are the queerest critturs as ever was raised!'"

Thus pioneered on her way, our English traveller reached Toronto, in time to be present when the false despatch was received among us announcing the fall of Sebastopol; and she rejoices with genuine British feeling over the sympathy which the supposed triumph of the British Arms excited. But unhappily at that recent date Toronto was not so well provided with hotel accommodation as it has since become, and the authoress draws comparisons between the quarters travellers then found in Toronto and in the cities of the neighbouring States, not

very flattering to the former. Hamilton commands a larger attention, and is described in a more graphic manner than Toronto, perhaps for the very reason that it was less like what a British traveller is accustomed to at home. Such at least was manifestly the impression it produced in the present case:—

“Hamilton is, I think, the most bustling place in Canada. It is a very juvenile city, yet already has a population of twenty-five thousand people. The stores and hotels are handsome, and the streets are brilliantly lighted with gas. Hamilton has a peculiarly unfinished appearance. Indications of progress meet one on every side,—there are houses being built, and houses being pulled down to make room for larger and more substantial ones,—streets are being extended, and new ones are being staked out, and every external feature seems to be acquiring fresh and rapid development. People hurry about as if their lives depended on their speed. I guess, and ‘I calculate,’ are frequently heard, together with ‘Well posted up,’ and ‘a long chalk;’ and locomotives and steamers whistle all day long. Hamilton is a very Americanized place; I heard of ‘grievances, independence, and annexation,’ and altogether should have supposed it to be on the other side of the boundary-line.”

Ancaster, Dundas, Niagara, and other places of greater or less note in Upper Canada, are described with equal life and vivacity; and thereafter, Montreal, Quebec, and the *habitants* of Lower Canada, with the like evidences of the hastily formed impressions of an intelligent wayfarer. Clifton House, and the Canadian side of “The Falls,” come in for a description too minute to be always complimentary. Our traveller “*did* the Falls” as thoroughly as any enterprising traveller could who had formed the resolution of being able to say she had done them; winding all up by going to the Rock House, donning a dress, which she pronounced on looking in the mirror, made her look “as complete a tatterdemalion as one could see begging upon an Irish highway,” and thus attired she accomplished the feat of going behind the Falls, and reaching *Termination Rock*. A duly attested certificate rewarded her heroism, testifying to the fact “That Miss ——— has passed behind the Great Falling Sheet of Water to Termination Rock, being 230 feet behind the Great Horse Shoe Fall.” This appeared so satisfactory a document to bear away from Niagara, that she was subsequently tempted to produce it to an American fellow-traveller in the cars, when he entirely upset her self-complacency, by pronouncing it “a sell right entirely, an almighty all-fired big flam!”

An interesting chapter is devoted to a statement of the capabilities and prospects of Canada, its climate, population, and attractions for emigrants. The impression produced on the writer’s mind appears to have been altogether favourable; and with her concluding remarks on

this subject we shall close this hasty notice of a book which compares very favourably with the majority of travellers' notes on Canada and the States :

"Taken as a *whole*, the inhabitants of both Provinces are attached to England and England's rule ; they receive the news of our reverses with sorrow, and our victories create a burst of enthusiasm from the shores of the St. Lawrence to those of Lake Superior. . . . At present every obstacle to Canada's further development seems to be removed—her constitution has been remodelled within the last few years on an enlarged and liberal basis,—her religious endowments have been placed on a permanent footing. . . . The sun of prosperity shines upon her from the Gulf of St. Lawrence to the distant shores of the Ottawa and the western lakes. She requires only for the future the blessing of God, so freely accorded to the nations which honor Him, to make her powerful. . . . It may be that in future years our mighty nation shall go the way of all that have been before it ; but whether the wise decrees of Providence doom it to flourish or decline, we can still look with confident hope to this noble Colony in the New World, believing that on her enlightened and happy shores, under the influence of beneficent institutions and of a Scriptural faith, the Anglo-Saxon race may renew the vigor of its youth, and realize in time to come, the brightest hopes which have ever been formed of England, in the New World."

D. W.

A Manual of the Detection of Poisons. By Dr. F. J. OTTO. Baillière, New York, 1857.

In that invaluable handbook of chemistry, generally known by the name of the *Graham-Otto's Manual*, but which has been so much improved and enlarged in the last edition, that it must rank as an independent work, the author, Professor Otto of Brunswick, devotes a large space to the subject of the detection of arsenic in cases requiring medico-legal investigation. He has since published this portion of the work separately, adding a description of the modes of detecting the other more commonly occurring poisons, and has added a valuable chapter on the general process to be adopted in those cases where the nature of the poison is unknown or unsuspected, and the chemist is consequently obliged to search for all.

This little work, which has recently been translated by Dr. Elderhorst of Troy, N. Y., forms, we have no hesitation in saying, one of the most valuable contributions to the literature of practical chemistry that has appeared for many years. Professor Otto is well known as a most accomplished chemist and accurate experimenter, and being in high repute, and constantly employed as an analyst in medico-legal investigations, the various processes recommended in his work have all

been verified in his own laboratory; and implicit confidence may be placed in his statements, as they are not mere compilations or extracts, but the results of actual experience. The subject of arsenic occupies the larger portion of the book, being a more generally used poison, and the methods of elimination applying equally well to many other mineral substances. The processes are described in clear and intelligible language, the best and most characteristic tests put prominently forward, and the confirmatory experiments placed by themselves, thereby obviating the difficulty which students often feel in choosing from a large number of tests those which are most reliable. We cannot but think, however, that the *iodate of potash* test, for distinguishing arsenical from antimonial spots, is worthy of being placed among the most characteristic reactions.

Dr. Elderhorst has made some valuable additions, especially the chapter on Oxalic Acid, all mention of which had been omitted from the original work, through some unaccountable oversight; for although poisoning by oxalic acid is not now so frequent as formerly, yet cases do sometimes occur, arising generally from accident or carelessness.

In the chapter on Hydrocyanic Acid, the translator has inserted some very important and useful additions; but we think that mention should have been made of Taylor's experiments on the detection of prussic acid mixed with animal matter, even when in an advanced stage of putrefaction. The test employed was that of Liebig, and gave eminently successful results, and should therefore be tried in cases where the body has been buried some time, although there is undoubtedly but little chance of any appreciable trace of the acid remaining unvolatilized. In such cases, or where only the contents of the stomach have to be examined, this process is preferable to that of distillation. (See *Chemical Gazette*, 1847.)

Dr. Elderhorst adds to this chapter a description of the ordinary process for determining the quantity of prussic acid contained in any liquid, consisting of the precipitation of the acid by means of nitrate of silver, and calculation from the amount of cyanide obtained. This process is open to the objection that it requires careful manipulation, occupies a considerable time, and when hydrochloric acid is present, becomes very complicated. It is curious that Dr. Elderhorst did not mention the beautiful method of estimating prussic acid, proposed by Liebig. As this plan is so easy of execution, occupying only a few minutes, and as it may often be of great value to medical men who are sometimes in uncertainty respecting the strength of their prussic acid, we need scarcely offer an apology for introducing a description.

A tube (alkalimeter) capable of containing 1000 grains of water, is graduated into 100 parts, and marked, beginning from 0 above; 17 grains of nitrate of silver are put in, and the tube filled up to 0 with distilled water, the mouth closed with the thumb, and the tube agitated until solution has taken place, a few drops will adhere to the thumb, but these can be scraped off. Of the prussic acid to be examined, 5.4 grains are accurately weighed out, mixed with about an ounce of water, and an excess of solution of caustic potash added. A little common salt may also be added, but is not absolutely necessary. The nitrate of silver solution is now poured in until permanent turbidity is produced; the precipitate first formed dissolves on stirring, but when it is no longer taken up on continued agitation, the operation is finished. The number of divisions of the nitrate solution employed, are now read off, and each one of the 100 represents 0, 1, or one-tenth per cent. of anhydrous hydrocyanic acid. Suppose 28½ measure have been employed, then the liquid contains 2.85 per cent. of pure acid.

Under the head of Strychnine, the various tests are described, and the methods explained by which the alkaloid can be separated in the state of purity required for their success. The suspected substance is treated with alcohol and tartaric acid, the liquid evaporated, treated with water, and the aqueous solution mixed with ammonia, which sets the strychnine free; by agitation with ether it can be extracted. Since the publication of the above translation, chloroform has been recommended as a substitute for ether. The chloroform rapidly absorbs the strychnine, and settles to the bottom, it can be drawn off, mixed with twice its volume of alcohol, and this solution yields on evaporation very distinct and pure crystals of the alkaloid. This process seems to be an excellent one, and likely to supersede all others. Some experiments made in the writer's laboratory with one third of a grain of strychnine dissolved in one quart of beer, were eminently successful, and afforded sufficient pure substance to make several chromic acid tests.

We cannot too strongly recommend this excellent little work to the attention of working chemists, medical men, and all interested in chemico-legal investigations; and many thanks are due to Dr. Elderhorst, not only for his excellent translation, which contains very few Germanisms,—herein differing most favorably from some other American translations of chemical works,—but also for his own very valuable additions.

The Edinburgh Review. No. CCXVII. January, 1858. *American Edition*: Leonard Scott & Co., New York.

The London Quarterly Review. No. CCV. January, 1858. *American Edition*: Leonard Scott & Co., New York.

The Westminster Review. No. CXXXV. January, 1858. *American Edition*; Leonard Scott & Co., New York.

The North British Review. No. LIV. November, 1857. *American Edition*: Leonard Scott & Co., New York.

The review of a Review is a species of critical sharp shooting, only recognisable in the Republic of letters under very special circumstances, such as we do not claim to exist in the present case. It is not, therefore, our intention to criticise the *Edinburgh Review*; to analyse the modern phases of English conservatism as exhibited in the *London Quarterly*; to sit in judgment on the heterodoxies of the *Westminster*; or even to discuss the accuracy of what Messrs. Leonard Scott & Co., of New York, deem it "proper to say" relative to their younger northern rival: "that the 'North British,' which had recently become less evangelical than in its earlier years, has got back to its *first faith*, and is now conducted on the same principles and with the same vigor which characterized it when under the care of *Chalmers* and his illustrious compeers."

What we propose to notice at present is the existence and circulation of these American editions of the English literary and political Reviews. The politics of our English party organs appear, indeed, to puzzle their American editors, nearly as much as our home editors are put about to supply the precise English equivalents for such transatlantic party names as Dough-faces, Hard-shells, Clear-Grits, Know-nothings and a thousand other ingenious political figures of speech. After painful analysis, however, the American reëditor eliminates the following nice shades of distinction in the periodicals which, as their New York publishers' advertisement states, "represent the great political parties of Great Britain." "LONDON QUARTERLY: *Conservative*. EDINBURGH REVIEW: *Whig*. NORTH BRITISH: *Free Church*. WESTMINSTER: *Liberal*. BLACKWOOD: *Tory*," or the "*embodied genius of Toryism*." Unfortunately the precision of such definitions is somewhat marred by the geographical influences which affect the significance of sundry of our most familiar designations. *Orthodoxy* does not differ more widely in its significance at London, Rome, and Mecca, than the Whiggery of English anti-conservatives does from

that of American conservative-whigs; though when one recalls the difference between the old Scottish *Wiggamor* of 1648, or even the Edinburgh *Whig* as he figures in Henry Cockburn's "Memorials of his Time," and what the Yankee would call the go-to-meeting respectability of the English *Whiggery* that makes its appearance under the *buff and blue* of the Edinburgh of January, 1858: it requires no great ratiocination to predict such a transmutation of the English Whig into practical conservatism, as has come over the Republican Whig of the New World, since those times in the American Colonies when all were whigs who were revolutionary ante-royalists.

English and American politics, however, lie out of our way; but not so the principles of literary piracy involved in this adventure, and in the whole system of American-English reprints of which it is a sample. An English Macaulay, or a Thackeray, a Carlyle, a Tennyson, or an Elizabeth Browning, expend the toil of months and years over the midnight lamp, and adorn the fruits of their labor with all the price-less fire of genius, and the Anglo-Saxon of America unblushingly pilfers the product hot from the press, and appropriates it to himself in happy accordance with

The good old rule, the simple plan,
That they should take who have the power,
And he should keep who can.

The American Nation is not incapable of liberal and generous acts. Does it never occur to any of the thousands who revel in the enjoyment of a Dickens', or Thackeray's, or Browning's pages, that therein lies the very source of their subsistence; that the earlier literary productions of some of these very authors have been produced with as sore travail as that which wrung the manly heart of young Samuel Johnson, when,—as Macaulay says, in extenuation of of the rougher asperities of his later years,—“he had been long tried by the bitterest calamities, by the want of meat, of fire, and of clothes, by the importunities of creditors, by the insolence of booksellers, by that bread which is the bitterest of all food, by those stairs which are the most toilsome of all paths, by that deferred hope which makes the heart sick.” How knows, or cares, the American reader whether the living English poetess may not be stimulated to the production of her inspired song, even as Felicia Hemans was, that thereby she might win her bread and educate her sons. Nay, how knows he but that the poet's song is even now as vainly sung as that of “the marvellous boy” who perished, starving, while bequeathing his strange immortal lays to other times. Such things did not all come to an end with the eighteenth century. The

life of the literary man, dependent on his pen, is still as hard a one to many a gifted aspirant for fame as ever it was. Borrow, in more than one of his autobiographic passages, hints not obscurely at his early struggles. One of the most popular works of another living author, named above, is believed to derive some of the pungent force of its sardonic humor from having been written on a sick-bed for bread. What a priceless boon to these, at such a time, would have been even the few cents per copy, which the niggard policy of American Statesmanship withholds, as an acknowledgment of the author possessing some fractional right to the productions of his genius. With what a just pride might the American lay claim to a common blood, and common tongue, and a common freedom, with England's ennobled historian, if when he is laid in his honored grave, the American reader of Macaulay could tell his sons, with pardonable boast, that the literary British peer did not contribute, unrequited, to his intellectual culture and enjoyment. But till such scant and tardy justice is done the English author, let no American critic presume to discuss, with cheap liberality, the stinted honors which British Statesmanship awards to literature and science. Let no windy rhetorician dare to allude to Milton's ill-requited "Paradise Lost," to Dryden's unwritten "Arthur," or to Scotland's Burns, doomed, for its paltry pittance, to exchange his pen for the guager's rod that kept his children from want.

There is a grim humor in the coolness with which the American publishers quote a Texas able editor's comments on the cost of the English Review articles as enhancing the marketable value of the transatlantic theft. "These publications," says the candid editor of the *Gonzales Inquirer*, "afford the cheapest and best reading that can be procured in the English language;" and then he proceeds to furnish to his readers the following apt and forcible comments on cheap literature so acquired, apparently without the remotest idea that any one could dream of asking an equivalent for the appropriation of literary productions the value of which he so frankly owns:

"It may seem strange, though it is true notwithstanding, that the articles which appear in them cost the concern by which they are originally published, about twenty-five dollars per page. The four Reviews for the year contain over 2,500 pages, and Blackwood alone, more than half that number, making in all about four thousand pages, the aggregate of which amounts to near one hundred thousand dollars. So wonderful is the operation of the press, and its advantages so great, that all this accumulated mass of learning can now be afforded to any one situated even in this remote region of Texas for an amount but little more than we pay for a hat, or pair of boots, and much less than the price of a 'green tissue' for our daughter, or a chip bonnet for our better half."

As if still further bent on committing the whole American nation to this wholesale act of literary piracy, our New York publishers print a column of "commendatory notices of distinguished individuals," relative to the American reprints of the Edinburgh and London Quarterlies, commenced so long ago as 1812. *Judge Story* considers commendation almost useless.

Richard Rush, "for one, most heartily wishes them a wide circulation in this country. They cannot fail to help the cause of literature and genius." *Dr. David Hosack* is certain "they have already done much, and are calculated to improve still further the literary taste of our country." *De Witt Clinton* ventures to affirm that "the merits of these Reviews are in his opinion pre-eminently great as literary works, and the American publishers are entitled to public patronage." *Dr. Eliphalet Nott* considers "Whatever diversity of opinion may be entertained as to their distinctive merits, the information concentrated and the talent evolved in each is such as to render their possession to the American scholar and statesman an object of the first importance;" and the *Hon. C. A. Rodney, U. S. Senator from Delaware*, remarks of the Edinburgh Review, "taking it altogether it embraces within its grasp every art and science. It strews with flowers the most intricate and thorny paths of learning, and renders the most abstruse subjects familiar to common minds. In it the scholar, philosopher, and statesman may all find lessons of instruction, and neither of them should be without a copy. To the professional man and to those in the common walks of life it affords a fund of rational entertainment and valuable information. It is the key that unlocks the vast and various stores of literary and scientific treasure which its writers have amassed by toiling in the inexhaustible mines of knowledge."

Most true is it, honorable and august senator of the great American nation, these stores of literary and scientific treasure, which you are thus appropriating as your own, have been amassed by the hard toil of writers, whose unremunerated labors go to enrich your wealthy republic, heedless though the toiler starve. "Behold, the hire of the labourer, which is of you kept back by fraud, crieth." But, "No!" elegantly and logically responds all America, through her able editor: "the articles which appear in these Reviews cost the concern by which they are originally published about twenty-five dollars per page; ergo, being already so well paid for, we may surely appropriate them to ourselves, in all conscience, at the price of a pair of boots!" And "No!" also indignantly responds the virtuous publisher, who after carrying on this unblushing robbery for years, under the high national sanction of America's copyright buccaneering system, now plumes himself, and congratulates his subscribers on the fact that he has at length brought the owners to his own terms, and has effected an arrangement for the receipt of *advanced sheets* from the British publishers, so that these reprints can be put into the hands of the Ameri-

can readers "at the price of a pair of boots;" while he is begged to N. B. *that the price in Great Britain, of the same five Periodicals, is \$31 per annum!*

That the cost of the Reviews and other high class British periodicals, to their publishers, is great, is most true; and that much of this arises from the liberal scale of remuneration by which the services of the best authors is secured, is also perfectly correct. Review and other periodical literature is the staff of life to the literary man, especially in the earlier stages of his precarious career. By means of well-paid London Quarterly articles Southey secured the literary leisure for his Portuguese History, and other laborious unremunerative labours. By his contributions to the pages of the Edinburgh and Westminster Reviews, and to Fraser's Magazine, Carlyle has been enabled to add his "Cromwell" and his "French Revolution" to the permanent stock of British Literature; and it is from among the host of "Magazine Writers," that the veterans of English literature step forth into the great arena of literary toil and triumph, producing the works which posterity will not willingly let die. It is because in the majority of cases the author must be well content to take out his reward for the great work of a life time, in fame, realized or anticipated, that the liberal remuneration he receives for the ephemeral productions of his pen, and the large prices he can command for the brief, though carefully elaborated and condensed Review Article, become of so much importance. They are designated by him, in homely metaphor, his *pot-boilers*. They keep the wolf from the door, while the busy brain and pen are weaving immortal lays, or dallying lovingly amid the intricacies of divine philosophy, or eliminating the national epos from the confused and contradictory rubbish-heaps of time. Thus was it with "Aurora Leigh," as we learn from her autobiographic confessions:

"I had to live, that therefore I might work,
 And, being but poor, I was constrained, for life,
 To work with one hand for the booksellers,
 While working with the other for myself
 And Art. You swim with feet as well as hands,
 Or make small way. I apprehended this,—
 In England, no one lives by verse, that lives;
 And, apprehending, I resolved by prose
 To make a space to sphere my living verse.
 I wrote for cyclopædias, magazines,
 And weekly papers, holding up my name
 To keep it from the mud. I learnt the use
 Of the editorial "We" in a review,

As courtly ladies the fine tricks of trains,
 And swept it grandly through the open doors
 As if one could not pass through doors at all
 Save so encumbered. I wrote tales beside,
 To suit light readers. But . . . what you do
 For bread, will taste of common grain, not grapes,
 Although you have a vineyard in Champagne."

And if it be so with the poet, it is even more so with those who instruct us in the lighter pages of Fiction. Sir Walter Scott contributed many a vigorous article to the "Quarterly" mainly because of its liberal exchequer; and it may perhaps be doubted if we should ever have had a "Nicholas Nickleby," or a "Vanity Fair," had not Dickens and Thackeray been first tempted to join these guerilla ranks of the light skirmishers of literature for a share of the pay.

"We ourselves," writes a Scottish member of the corps, "receive from Chambers's Journal twenty-one shillings per page, and for the continuous tales in the serial, a guinea and a-half per page is paid. In a page of Chambers there are about 1370 words—in a page of the Leisure Hour there are usually 1120 words, and for that number the Religious Tract Society pays fifteen shillings. Eliza Cook used to pay us a guinea for a page containing about 1250 words, and Charles Dickens still pays that sum for a page including only 1050 words. For the much smaller pages of Tait's, Sharpe's, Bentley's, and the New Monthly, half a-guinea etc is paid, while for pages of about the same size, Blackwood and the Dublin University pay double that price. For reviews, the Athenæum pays half-a-guinea, and the Critic and Literary Gazette, seven shillings per column, while the Quarterlies pay their contributors at rates varying from eight to sixteen guineas per sheet of sixteen pages." And this writer is no selected exceptional case, such as we could refer to, but one receiving the ordinary rate of pay.

By means of this liberal and widely recognised tariff, literature has become a regular profession in England, into which many of the ablest of those who were destined for the church and the law, for medicine and the arts, and even for commerce and trade, are drafted off from time to time, until the periodical press has become a power of recognised weight and commanding influence in the British Empire. But with all the improvements in the fare of the literary adventurer since the days when Collins and Goldsmith, and Fielding, and Thomson, could each diversify, from personal experience, the incidents of arrest for debt, we can point to few instances of fortunes won by literature. The successor of Samuel Johnson no longer devours a hungry meal behind the screen at St. John's Gate, which served to hide his ragged attire; but the literary guild might still accept of the motto suggested by the witty chaplain of the young Edinburgh reviewers in their elevated seclusion among the eighth and ninth flats of Buccleugh street,

‘*Tenui musam meditamus avena* :—We cultivate literature on a little oatmeal,”—a motto which it will be remembered was exchanged for a sententious scrap of philosophy from Publius Syrus, because the former was found a little too near the literal truth to be quite agreeable to those literary adventurers.

The reasoning of many a young and inexperienced literary adventurer, when first launched fairly into the middle-stream,—a recognised contributor to sundry of the standard Weeklies, Monthlies, and Quarterlies,—has been very much in this Alnascar fashion: “I get eight guineas per sheet for an article, such as that which I have just finished within the week. There are fifty-two weeks in the year, and authors who receive, not eight but sixteen, and even thirty guineas per sheet; what may not a young hopeful like me anticipate.” And it is well accordingly, if our hopeful young visionary do not marry on the faith of it, and start a domestic establishment in modest emulation of Abbotsford or Strawberry Hill. But long before he gains admittance to the rank of veterans—if ever he get there—he has learned that head-work cannot be carried on like hand-work, systematically on day-wages; that there are not fifty-two, nor even twenty-six weeks in his year; and that in truth sixteen guineas per sheet for the concentrated essence of the study and thought of years, is after all no such high-road to fortune as he had fancied when he reaped the first harvest from his fallow brain.

If therefore it be true that the wretched traditional race of Grub street literary hacks be no more; and Pope’s satire would no longer furnish a sufficient directory for finding Curll’s authors—“the historian at the tallow-chandler’s under the blind arch in Petty France, the two translators in bed together, or the poet in the cock-loft in Budge row, whose landlady keeps the ladder;”—and though a pre-Raphaelite Hogarth of the present day would no longer find his Tragi-Comedy in the pale young wife of the sans-culotte author, dunned, in his garret, for the milk-maid’s tally-stick, while she plies her needle to repair the threadbare but indispensable nether garment,—though all this, we say, be no more, nevertheless, no one possessed of the slightest knowledge of the subject will say that the English literary man of the nineteenth century is overpaid. Nor would it have been an act of supererogation for the appreciative American editor, who “most earnestly advises all parochial literary clubs and Lyceums to take these valuable publications, as they cannot realise anything like the same amount of literary and intellectual wealth for a similar outlay;” if he had added,—and when you have realized the amount of literary and

intellectual wealth thus appropriated, consider, good American reader, what the judgment on you, and your copyright law will be, in the great final court of appeal of posterity, when it shall appear that in so doing you were withholding their just meed, and robbing of their hardy earned wages, the English Chattertons and Goldsmiths, the Fieldings and Johnsons, of this later century. Consider, most appreciative American reader, what a Carlyle, a Kingsley, an Isaac Taylor, a Thackeray, or others of those who, in pursuit of literary fame,

“Scorn delights, and live laborious days;”

might have contributed to you in return for the small percentage you would never miss. Consider that, guaranteed in such, Hugh Miller, —relieved of the drudgery of editorial task-work,—might have lived and wrought, might have taught and delighted us and you still. If that old England of ours be in reality a sort of guano-island from which you may thus calculate on importing such fertilizing cargoes for your own intellectual culture, would it not become your practical sagacity to get the most and the best out of it, even at the cost of a very little temporary self-denial. What Hugh Miller might and could have done, would have rendered very insignificant all he has done; and would have well repayed you for any investment. Poor old Dr. Dick, the author of “The Christian Philosopher,” and other works more highly appreciated in the States than at home,—at the very time that his writings were selling to admiring American readers for behoof of their dishonest appropriators,—had to go well nigh a begging, at the age of eighty-three, before the meager pension of £50 was doled out to him from the British Privy Purse. Happily such cases are not the rule in the experience of our modern literary men; but authors enough might be named, whose works have been selling by thousands for behoof of their American appropriators, while they have been compelled to uncongenial toil to win for themselves the income needful for their most moderate requirements. In his column of “gossip” the enlightened citizen of the American “Modern Athens,” might glance over the notices of contributions, literary and dramatic, generously made by a Bulwer, or Dickens, or Martin: now on behalf of a *General Literary Fund*, and again for the family of a Douglas Jerrold or other deceased author, whose works the lettered citizen had meanwhile seen surreptitiously appropriated for his own behoof; and the titles of which he could read off in whole columns in the advertising sheets of Boston’s most reputable publishers, to be had at the low charge of 75 cents per volume:

“We, the liberal and enterprising publishers of the Great American Nation, being able to offer such to our enlightened citizens as one of the fruits of our glorious Revolution, whereby, after all its other triumphs, we have the delectable privilege of stealing the brains and picking the pockets of starving authors. N.B.—The Felicia Hemans’s, Charlotte Bronte’s, Margaret Oliphant’s, Mary Somerville’s, and other popular authoresses, being Britishers and aliens, we have the pleasure of informing our customers that the privileges and courtesies of womanhood do not apply to them on our side of the Atlantic; and so we have the gratification of offering you the fruits of all their toil, also, without your having to pay a single cent for anybody’s labour or profit but our own. It beats the Declaration of Rights hollow; for if you do appropriate *the works* of one of your colored authors of plantation cotton and sugar cane, you cannot let him starve, as may be done with those alien geniuses of ours!”

Yet let us not blame too severely the American Publisher, for what is the sin of the nation. Some of these publishers have given creditable evidence of their desire to acquire by honorable means their right to the works of British Authors; and among such none have been more liberal than Messrs. Ticknor & Fields, of Boston. Robert Browning thus writes to them, from Paris, in 1855:

“I take advantage of the opportunity of the publication in the United States of my ‘Men and Women,’ for printing which you have liberally remunerated me, to express my earnest desire that the power of publishing in America this and every subsequent work of mine may rest exclusively with your House.”

Again the authoress of “Aurora Leigh” writes from London, at the date of its completion:

“Having received what I consider to be sufficient remuneration from Mr. Francis, of New York, *it is my earnest desire that his right in this and future editions of the same, may not be interfered with.*”

Again, Mr. De Quincey thus writes to Messrs. Ticknor, Reed, and Fields, transferring to them certain new papers for their collected edition of his writings:

“These I am anxious to put into the hands of your house, and, so far as regards the U. S. of *your* house exclusively; not with any view to further emolument, but as an acknowledgement of the services which you have already rendered me, . . . in having made me a participator in the pecuniary profits of the American edition, without solicitation or the shadow of any expectation on my part, without any legal claim that I could plead, or equitable warrant in established usage. . . . They are now tendered to the appropriation of your

individual house, according to the amplest extent of any power to make such a transfer that I may be found to possess by law or custom in America."

These are creditable testimonials to the publishers who print them, but what do they amount to? So far as the American nation is concerned in the matter they make things considerably worse. Such letters indeed might be usefully copied in other matters besides book-traffic. Messrs. A.— B.—, a Greek house in the Levant, having sold a cargo of Odessa wheat to a Liverpool skipper, could not do better than supply him with a similar document, to produce on the coast of Barbary, in case any colored gentlemen of an enterprising turn, in that free and enlightened corner of the globe, should take a fancy to visit him on the voyage home. The attention it would be likely to receive would depend, we imagine, fully as much in the one case as in the other, on the probable risks and profits likely to be the result of either appropriation.

One example in proof will suffice. A New York firm, by no means the foremost among American publishers to recognise any claims which British authors might fancy they had on those who appropriated their works for the purposes of trade, have found, or fancied, it for their interest to give Mr. Thackeray two thousand dollars for early proof sheets of his "Virginians;" a similar transaction with Mr. Dickens for his "Little Dorrit" having proved a profitable speculation. But another publisher, as they indignantly complain, has begun to reprint these very sheets of "The Virginians" in the columns of a New York daily paper; an act which Messrs. Harper protest must put an end to all monetary transactions between British authors and the American appropriators of their works. In the light of this, the most recent illustration of Anglo-American copy-rights, we may estimate the monetary value of Elizabeth Browning's "earnest desire" that the chivalry of America will respect her rights of authorship; or De Quincey's grateful transfer to the liberal Boston House, of all the rights in the creations of his own hand and brain which *he may be found to possess, by law or custom, in America!*

And what, meanwhile, does the American author say to all this? If no chivalrous sympathy with his order, awaken him to a generous fellow-feeling for his English brother, does it not occur to him to ask what is its effect, for example, on his own solitary "North American Review." Does that native periodical perform the important functions to the literary men of the Union, or even of Boston, which have been done to those of Edinburgh and London by their Magazines and Reviews? Is it no direct and palpable, though inestima-

ble loss to the American literary men, and consequently to American literature, that Harper's New York Magazine has gone on for years appropriating the contributions made to English Magazines, instead of honestly paying its own writers for original material, such as a citizen of the Great Republic could read without blushing, in the presence of an Englishman. We dare say Mr. Bentley of London is not much the worse for it, that the great New York house carries its wholesale pilfering so far that the very wood-cut device on "Harper's" wrapper, instead of being commissioned and paid for among the artists of New York, is stolen from the cover of "Bentley's Miscellany." Poor Raphael Michael Angelo Daub, however, that ill-faring genius in his Broadway attic, might have dined sumptuously on it for a week, and his far distant brother in smoky old London never a bit the poorer for it. Let the English *Littérateur* derive from the fact such pleasure as he can, that if the 'cute Yankee does rob him wholesale, it is in order to furnish the means to starve his own native-born literary men, and drive them fairly out of the field. Boston, however, if report speaks true, boasts of a literary aristocracy, with purses well balancing their golden pens, to whom the maintenance of the Union's Literary repute is a thing altogether apart from base considerations of pelf. The names of Prescott, and Longfellow, and Agassiz, and others of her gifted sons, are too well known and appreciated not to make us rejoicingly credulous in relation to all that pertains to their well-being; but some such morroco-chaired and easy-slippered reviewer it must have been who garnished his "North American" article with the famous verses of the old Metaphysician and Bishop of Cloyne :

The muse, disgusted at an age and clime,
 Barren of every glorious theme,
 In distant lands now waits a better time,
 Producing subjects worthy fame.

There shall be sung another golden-age,
 The rise of empire and of arts,
 The good and great inspiring epic rage,
 The wisest heads and noblest hearts.

Not such as Europe breeds in her decay;
 Such as she bred when fresh and young,
 When heavenly flame did animate her clay,
 By future poets shall be sung.

Westward the course of empire takes its way ;
 The four first acts already past,
 A fifth shall close the drama with the day ;
 Time's noblest offspring is the last.

This is a favorite quotation with the American orator, and no wonder it should be. But what dawn does the literary man see as yet, in promise of this "Golden Age," for the singing of great inspiring epics by America's future poets? "Why music with her silver sound?" demands Peter of James Soundpost, in "*Romeo and Juliet*," who knows not what to say in reply. "O, I cry you mercy!" retorts the acute Peter: "You are the singer, I will say for you—It is—music with her silver sound, because such fellows as you have seldom gold for sounding!"

To the English literary man, it is unquestionably a grievous wrong, that, while the Manchester and Glasgow manufacturer finds all protection for his "soft goods," in Boston or New York, and the hardware of the Sheffield worker may seek its best market in the Union, as elsewhere; the manufactures of the historian, the poet, the essayist, and the novelist, are contraband, and may be appropriated for his own behoof by any pilferer who finds or fancies it his interest to steal. We cannot doubt that there are many—though still a minority—among the intelligent citizens of the States, to whom Thackeray and Tennyson, Macaulay and Grote, Carlyle, Ruskin, McCosh, and other favorite British authors, would not be less, but more welcome, if it were believed that America's appreciation of them was not unproductive of more substantial returns than such barren laurels. In the case of the Review reprints, however, the British essayist is not without some return. If his literary work is appropriated without leave asked or remuneration offered, it is something for him to know that the *Edinburgh* and the *London*, the *North British* and the *Westminster* Quarterlies, have hundreds of readers in the United States, for one that their native-born Review can command. The power thus wielded within a foreign state is beginning at length to be appreciated. Already we have seen examples of the American statesman sending home his carefully elaborated article, that by its reappearance in the surreptitious American reprint of the British Review, it may produce an effect which he would in vain look for from any article issued under the sanction of a native periodical. The English writer learns also to feel that he is writing for the perusal of the whole Anglo-Saxon race. American as well as Colonial affairs begin to command a more enlarged attention; and not the

least satisfactory phase, in this good educed out of evil, is an improved tone in treating of American affairs. In dealing even with the great social evil, it is no longer deemed sufficient merely to give utterance to an inarticulate howl over the wrongs of the slave. The matter-of-fact political economist, and the enthusiastic philanthropist, are both learning to apply their own home experience and so to take a more comprehensive view of the difficulties with which the American has to deal: recalling to remembrance the slow process by which England has delivered herself from her own social wrongs,—fighting the battle for generations before she could remove the disabilities of the Protestant nonconformist; restore her representative system to some conformity with the theory which had so long been her boast; or even rid herself of the protective system which checked alike the development of her commerce and agriculture. The necessity for accurate and minute knowledge on America is creating that interest in her proceedings, out of which kindlier sympathies will grow. A spirit at once more generous and more just rules the pen of the English writer who ventures to touch on American affairs, though still ignorance will at times betray its presumption, and obtrude its folly. In this direction, at all events, the good influence is at work, and it will be no slight alleviation of all the wrongs of the English author, if the final result be the binding together more closely, by an intelligent appreciation of each other, the common descendants of what Milton proudly called "God's free Englishmen."

And how stands it with us in Canada, meanwhile? We are, of course, virtuously indignant at the very name of slavery, repudiation, fillibustering, and literary piracy; and are quite ready to cast the first stone at our offending neighbor, caught in the very act: we being so entirely without sin ourselves! That American reprints are sold as freely in any of the British Provinces as in the States, has long been notorious to all men. This had existed as an illegal usage which it was convenient for the Colonial conscience to overlook, till the cry of the British author for a further instalment of justice at home, directed attention to this additional grievance, and at length an Act of the Provincial legislature legalized the admission of American reprints of British authors into Canada, on their paying a duty of 10 per cent., which per centage was to be handed over as a sort of black-mail discount for behoof of the despoiled author. Such accordingly has been done on two separate occasions. We have been at some trouble to ascertain the facts, and learn that for the years 1854-55, a first instalment of £252 11s. 3d. was paid over

by the accredited provincial authorities to the *British Custom House*, being the duties collected in the interval from the passing of the Provincial Act, on American reprints of British authors, introduced into the Province. In 1856, a further sum of £313 6s. 10d., was in like manner transferred to the supposed agent and receiver on behalf of the British author; and there now lies a further sum ready for disposal in like manner. But the awkward bit of the business is that the duties on imported reprints are not collected, so much on Macaulay, so much on Meg Dods, so much on Tennyson and Firmilian, on Thackeray and James, on Dr. Livingstone and the Hon. Miss Murray, but all in a lump; so that, while we pay this composition to our self-constituted representative of the literary home-creditor, and wash our hands clear of the whole business with all good conscience, one does not see how the poor literary gentleman, in his Grub Street attic, is to be in any degree benefited by such vicarious transaction. Did any English author, we wonder, ever hear of this Canadian "conscience money"? Does it go to provide the Poet Laureat's annual butt of Canary, or is it engulfed in the mysterious disbursements of the Literary Fund?

Meanwhile we have recently had rather an unpleasant illustration of the one-sided operation of non-international copyright law. The well-known popularity of Mrs. Stowe's "Uncle Tom," naturally drew attention to her forth-coming "Dred," and no sooner did it make its appearance, than two enterprising Canadian publishers,—one in Montreal, and another in Toronto,—issued editions of it. Mrs. Stowe had, it seemed, published^d simultaneously in Britain and America, to secure a double copyright; but the Canadian publisher having copied the American edition, with its special preface, dreamt of no danger. In this, however, he was mistaken. The American authoress interfered, and through her British publisher, appealed to the law of England as applicable throughout the Empire. The claim, at the first blush, seemed a bit of American impudence, worthy of Barnum's effrontery. Calm consideration, however, showed that it involved a high principle, not to be decided by mere motives of personal interest; and, as was to be expected, justice prevailed. The Canadian publisher found himself compelled, however loth, not only to suppress his edition, but to pay £100 damages to avert further legal process. The case may seem a hard one, which thus allows the piratical publisher of the United States to steal, and even protects him in the sale of his stolen goods; and yet when the Canadian publisher makes reprisals on the American author, the law steps in to protect such alien rights.

Yet we cannot but rejoice that it was so decided. It was worthy of Britain, and honorable to the Province. Let us hope that such an example of the impartial and self-denying award of justice, in the face of such notorious wrongs as might well have tempted to an opposite course, will not be lost on our neighbors; and that they too may perceive that not only the honor, but even the true interests of a great nation may be ultimately promoted by a disinterested course of justice, rather than by a systematic procedure which must justify itself, according to any conceivable law of nations, by an appeal to precedents set by the Barbary Corsair, or the West Indian Buccaneer.

There is one lesson, however, which the above phase of Canadian copyright might teach the British publisher. If the sale which a popular work can now command in Canada is so great that two different publishers could see their interests compatible with the issue of an edition of Mrs. Stowe's "Dred," why should not the British publisher forestall the American piratical reprinter, by means of cheap Colonial editions. If the American publisher can make a profit among us on the works of Layard, Tennyson, Hugh Miller, Thackeray, Livingstone, and other favorite authors, the British publisher may do the same, by the simultaneous issue of English and Colonial editions. Why should not Macaulay be read in every corner of the empire in an English edition; and Dickens' scenes of home-life come to us with the native imprint; and Tennyson open on us, in all his patriotic fervor of inspiration, on leaves that have been "composed" from his own MSS. and corrected by his own pen. If the English publisher will not so supply us, he cannot complain if we object to his playing the dog in the manger, and interfering with others who will. The New York reprints of the British Quarterlies bear on their wrappers the names of agents in Canada, New Brunswick, Nova Scotia, and Barbadoes; and we believe they now find their way to New Zealand, Australia, and the Cape. Certain it is that the American publisher, by escaping all payment to the author, is able to undersell the British publisher in every Colony of the empire. The British publisher must, therefore, so far learn to ignore the author, in calculating the cost of his work. The type is standing. Why not use it for the cheaper Colonial edition? The copyright has been acquired; wherefore not employ it as if it were the printed copy from which the American publisher takes his surreptitious reprint? Unquestionably for works of really popular interest, the sale throughout the British Colonies would prove abundantly remunerative; and even should the author enjoy no direct share of these profits, his interests are not so entirely dissociated from those of his

publisher that he need grudge him what would otherwise go to the foreigner, who may,—as he not unfrequently does,—take any liberty with the text that self-interest or caprice may dictate.

But we would rather hope to see this question settled on a wider basis, and embracing larger interests, wherein those of the author shall not be entirely forgotten. Nor is such an idea altogether Utopian. A recent notice of the *New York Daily Times* shows, at least, that the project of an international copyright between Great Britain and the United States, is not regarded as entirely hopeless. The following are the terms of a proposed arrangement, the authorship of which is ascribed to Mr. Goderich :

1. An author, being a citizen of Great Britain, shall have copyright in the United States for a period not exceeding fourteen years, on the following conditions :

2. He shall give due notice in the United States of his intention to secure his copyright in this country three months before the publication of his book, and this shall be issued in the United States within thirty days after its publication in Great Britain.

3. His work shall be published by an American citizen, who shall lodge a certificate in the office of the Clerk of the Court of the District where he resides, stating in whose behalf the copyright is taken, and this shall be printed on the back of the title page.

4. The book shall be printed on American paper, and the binding shall be wholly executed in the United States.

5. This privilege shall be extended only to books, and not to periodicals.

6. The arrangement thus made in behalf of the British authors in America to be extended to American authors in Great Britain, and upon similar conditions.

The terms, it will be seen, preclude periodicals from their operation, and would, therefore, leave unprotected that important and highly profitable feature of the *feuilleton*: the contribution of the novel, biography, or tale of travels, to the pages of a periodical, before its publication in a complete form. This, as it is one of the greatest sources of direct profit both to the British and American author, specially requires reconsideration. That the plan leaves the British Quarterlies entirely out of the pale of all legal protection, we do not overlook. We presume their publishers will at least retain the privilege of bargaining for the price of "first sheets," so long as they continue to be worth republication. That there is no doubt at present on this latter question of their being worth republishing may be seen by the following extract from Messrs. Scott & Co.'s last annual circular, borrowed from the *Chicago Tribune*, with its gossip about the editorial staff not altogether up to the latest date :

“Of *Blackwood* we hardly know what to say. Although it may be called the embodied genius of Toryism, yet its witching rhetoric, its captivating style, its profound disquisitions, its range of elegant fiction, its slashing yet brilliant criticisms, its poetry, biography, historical and fictitious narratives, so charm the sense, that criticism is disarmed, and we are lost in admiration. The circulation of *Blackwood* in England is said to be 40,000 copies. It is also widely circulated in this country, and is universally admired. The publisher recently informed us that ‘*Blackwood edits itself*,’ yet its list of contributors is well known, and embraces an amount of talent and genius which has rarely if ever been concentrated on a single periodical.

The present Editor of the *Edinburgh* is Mr. REEVE; of the *North British*, Prof. FRASER [?]; of the *Westminster*, JOHN CHAPMAN (the American London bookseller) [?]; of the *Quarterly*, Rev. W. ELWYN. An able corps is attached to each Review, selected from the choicest talent of Great Britain.

Sustained, then, as these distinguished works are and ever have been, by the highest order of scholastic ability and political sagacity, we need not be surprised to find them occupying such a proud pre-eminence among the literary productions of the world, and the neglect of their high claims upon the consideration of all classes of the intelligent community, would necessarily argue a corresponding indifference to the great interests of the common weal.

Every intelligent reader should subscribe to these periodicals furnishing so much seasonable intellectual aliment, and which the enterprise of American publishers has placed within the reach of all.”

Had it suited the publisher’s purpose, we should have preferred an extract from a southern editorial notice, being curious about the reception of some of these quarterly visitors by over-sensitive southern gentlemen of a bilious or choleric turn. But we have not heard of Messrs. Russell & Jones of Charleston, or Mr. Bell of Alexandria, Va., or Mr. Morgan of New Orleans, who figure on the wrappers, being tarred and feathered for the sale of incendiary publications; so we presume it is all right, and perhaps, indeed, upon the whole, consoling to wounded southern feelings to think, while perusing these American reprints, that the meddling British scribe is never a picayune the better for all the copies that circulate from Maine to Florida.

D. W.

Descriptions of New Species of Palæozoic Fossils.—[Extracted from the Report of the Regents of the University, for 1856.]—By James Hall. Albany, 1857.

The two volumes already published, of the Palæontology of the State of New York, by Professor Hall, of Albany, comprise the fossils of the respective subdivisions of the Lower and Upper Silurian forma-

tions, from the Potsdam Sandstone to the Onondaga Group inclusive. In the publication now under notice—an octavo pamphlet of 150 pages, with numerous wood-engravings—the author anticipates, in part, the volumes of the “Palæontology” that have yet to appear; being driven to this course by an act of scientific dishonesty, against which we cannot too loudly exclaim. It may not be generally known that the original intention with regard to the publication of the Palæontological results of the survey of New York, was to issue a single volume merely, with wood-engravings of the more common or characteristic fossils. In furtherance of this view, a number of wood-cuts were prepared; but in consequence of a more extended plan of publication being afterward adopted, and copper-plate engravings authorized for the illustration of the work, a few only of these wood-cuts were made use of. The blocks were subsequently obtained, under questionable authority, from the Curator of the State Cabinets of Natural History, in Albany; and many of the figures were published without the permission of their author. Fearing that the publication of other figures, illustrative of species yet undescribed, may follow, Professor Hall has issued the present volume, with a view to secure himself against being thus forestalled. The accompanying remarks, attached to the volume by way of preface, explain these facts more fully.

“During the progress of the Report upon the Fourth Geological District of the State, a considerable number of woodcuts were engraved for the illustration of the fossils of the Hamilton and Chemung groups which were intended for that volume. Before the volume was entirely out of the press, the preparation of the Palæontology of the State was placed under my direction. According to existing contracts with the State, the wood engraving was continued; and as the first intention was to complete the work on the palæontology in a single volume, drawings were made of the more common and conspicuous fossils of all the successive rocks, or of all such as I had the means of procuring.

“However, after ascertaining the great amount of material, and the necessary extent of the work, the plan of publication was changed, and several volumes were authorized; more extended collections were made, and the work prepared as it has already appeared in the published volumes, in the first of which some of these cuts were used.

“In the mean time the woodcuts of many unpublished species of fossils, together with others for generic and elementary illustration, intended for the Palæontology of the State, remained in the custody of the Curator of the State Cabinets of Natural History, until the autumn of 1854, when, under doubtful permission, these cuts were removed from the Geological Rooms, and some of them soon after appeared in a private publication. After much delay, the original woodcuts were restored to the custody of the proper officers, but not until after they had been *stereotyped*; and as the stereotypes remain in the possession of the party who first obtained the cuts from the Cabinet, it is in the power of that

party to publish the illustrations of many new species in advance of the issue of the State Work on Palæontology, and to the prejudice of the interests of the State therein. Under these circumstances, it is thought proper to give concise descriptions of these fossils, prior to their appearance in the regular volumes of the Palæontology."

During the early part of 1856, an attempt was made by certain interested parties to arrest, or at least impede, the issue of the volumes of the Palæontology, still under preparation. A so-called "Report," of a most glaringly one-sided character, was got up by a "select committee" of the House of Assembly, opposing the work on the score of expense, and condemning the number of the illustrations as a piece of wanton extravagance. Against this, we ventured at the time to protest;* and we were happy to find that the Report met with no favor from the members of the Assembly generally, and was not acted upon in any way. We mention this more especially, because, if we mistake not, it was argued in this Report, that the wood-cuts already alluded to, were amply sufficient for all practical or scientific purposes—a fallacy brought out very prominently by the engravings in the present volume. Some of these are tolerably well executed, but the majority of them are altogether insufficient for the really useful illustration of the more minute and important structural details. It is quite evident that Professor Hall acted for the best interests of science, when he discarded the wood-cuts in question for the beautifully executed engravings of the Palæontology proper.

In the present publication, the Brachiopoda of the Lower Helderberg, Oriskany Sandstone, Upper Helderberg, Hamilton, and Chemung groups, respectively, are alone considered. Nearly all the species described are new: and many, the Producti more particularly (from their comparative rarity as Devonian forms), are especially interesting. A number of species of this type, more than doubling those hitherto recognized in the Devonian rocks of Europe, are here enumerated from the Hamilton and Chemung groups, the lowest in which they occur. Professor Hall has also revived, or re-constituted, several genera, more or less abandoned as such, by European Palæontologists. There will probably, however, be some difference of opinion as to the expediency of these revivals. We doubt much, for example—with all deference to the justly-distinguished author—if the revival of the *Meganteris* of Suess will be adopted by palæontologists generally. So far as we can

* Canadian Journal, New Series, Vol. I. p. 386.

judge from Prof. Hall's figures and descriptions, for no definition of the genus is given, it appears to us that the species here included, might be legitimately arranged under McCoy's *Athyris* (*Spirigera*, d'Orb.); or, in part, under *Terebratula*, in which genus, as the type of a group of Palæozoic *Terebratulæ* without *deltidium*, we would place the *Seminula* of McCoy. The texture of the shell in Hall's *Meganteris* is not stated. In the work now under notice, little more than a brief enumeration of the proposed new species could be expected: the author's object being simply, as before observed, to ensure a priority of publication. It will add however, very much to the utility of the volumes of the Palæontology about to appear, if a definition of each genus be given, and a distribution of the genera into families be at the same time adopted. Comparisons will in this manner be much facilitated, and an air of greater completeness imparted to the work. These definitions are not only essential in the case of new genera, but they are equally necessary with regard to genera already established; because in adopting one another's genera, palæontologists are rarely agreed as to the precise limitation of these. With the progress of discovery, indeed, the necessity of modifying earlier definitions will, from time to time, unavoidably arise; especially as it is above all things desirable to keep down the array of new names as much as possible, and to guard strictly against the adoption as generic, of characters of a specific value only. In Palæontology—and in the Class Brachiopoda more particularly, where the most essential characters, for instance, are so rarely to be observed—the greatest caution, for the sake of those who come after us, is in this respect, necessary. With regard to specific forms also, we trust the day is not far distant, when palæontologists will be willing to admit that a merely relative difference—a difference, for example, that cannot be properly appreciated without the aid of figures—is not a sufficient warranty for the foundation of a second species. These remarks however, are not to be applied to the author of the work of which we now take leave. Our readers, if at all acquainted with the subject, will know well, that if Professor Hall, in accordance with a system too much in vogue, had chosen to turn "species-maker," he might have given us twenty new species, where he has given us one. For the exercise of this discriminating judgment, palæontologists generally owe him their best thanks.

SCIENTIFIC AND LITERARY NOTES.

GEOLOGY AND MINERALOGY.

POST-TERTIARIES, ETC., OF MONTREAL.

Professor Dawson, Principal of McGill College, has favored us with a copy of a very interesting paper on the Newer and Post Pliocene beds of Montreal and its vicinity, lately read by him before the Natural History Society of that city. The deposits in question, commencing with the lowest, are characterised as follows:—

1. The ordinary Boulder Clay; 2. Leda Clay, an unctuous calcareous clay containing a few marine fossils, and reaching in places a thickness of twenty feet; and, 3. Saxicava Sand, a fine-grained sand, in places underlaid or replaced by stratified gravel, and containing marine fossils in the lower part. Boulders occur in the two upper deposits as well as in the Boulder Clay, properly so called. In places, the Leda Clay has been apparently carried off by denudation, the sands and gravel resting directly on the Boulder Clay, or on the underlying Limestone, as at the Mile End quarries, &c. In a deposit of sand and sandy clay occupying a depression between these quarries and a ridge formed by a thick trap-dyke near the house of James Logan, Esq., Professor Dawson discovered (with many already recognised forms) no fewer than eleven distinct species of gasteropods and lamellibranchiate molluscs, besides a serpulid, a cytheridean, several foraminifera and the spicula of a sponge—not hitherto described amongst our post-tertiary fossils. In addition to these, several new species, obtained principally by the Geological Survey, the author, and the Rev. Mr. Kemp, from the neighborhood of Montreal, Beauport, and elsewhere, are described for the first time by Professor Dawson in his paper; thus bringing up the list of new forms due to his determinations, to about thirty. As the author observes, these marine shell-bearing deposits although occurring in various parts of Lower Canada, have not been met with further west than Kingston. During the last two summers we have searched very diligently for their presence amongst our drift and post-tertiary formations, but without success. Our limited space prevents us from entering into a fuller analysis of Professor Dawson's valuable communication, but the geological reader will find the entire paper in the last number of the *Canadian Naturalist*.

PLACODUS.

Professor Owen, in a letter addressed to the editors of the "*Annals of Natural History*," and published in the November number of last year, has expressed his conviction that the *Placodus* of Agassiz—a supposed fossil fish of the Triassic epoch—belongs really to the class of Reptiles. This view has been adopted from an examination of specimens of *P. Andreani*, sent by the well-known mineral dealer, M. Krantz of Bonn, to the British Museum. [The species of *Placodus* hitherto enumerated, comprise: *P. Andreani*, Münster; *P. rostratus*, Münster; *P. gigas*, Agassiz; *P. Münster*, Ag.; and *P. impressus*, Ag. The last is from the new red sandstone of Deux Ponts; the other four, from the Muschelkalk of Bamberg in Bavaria. Teeth, and portions of the cranium are only known.] Professor Owen promises further details.

UNITY OF PLEURACANTHUS, DIPLODUS, AND XENACANTHUS.

Sir Philip Egerton (*Ann. Nat. His. No. 119*) has ascertained the mutual identity of the carboniferous fish-types, *Pleuracanthus** and *Diplodus* of Agassiz; and he has also shewn, as previously suspected by Beyrich, that the *Xenacanthus Decheni* of the Permian beds of Bohemia, &c., is generically identical with *Diplodus*. *Orthacanthus*, Ag., is likewise a closely related form, if not really, as viewed by Goldfuss, the same type. Considering, says the author, publication as the test of priority, the genera *Diplodus* (1843) and *Xenacanthus* (1847) must merge into *Pleuracanthus*, which was put forth in the "Poissons Fossiles" in 1837.

SILURIAN STAR-FISHES.

Mr. Salter (*Ann. Nat. His. Nov. 1857*) has described a number of new star-fishes—*Asteriadae* and *Ophiuridae*—chiefly from a recently discovered locality at Leintwardine in Shropshire, where they occur in the flag-stones of the Lower Ludlow Rock. Species of our New World genus, *Palæaster*; Hall—a type ranging in England from the Lower Silurian into the base of the Carboniferous series—are also described in the same paper. The genus is defined by Mr. Salter as follows:—*Palæaster*, J. Hall. Arms thick, convex, short or moderately elongate, and formed of many rows of small spinous ossicles above (with a madreporic tubercle near the angle of one pair of arms): ambulacra deep, with *transverse* ossicles, and a single row of large adambulacral plates. Disk plates between the arms, none.

CIRCULAR POLARIZATION IN CINNABAR.

M. Descloizeaux (*Annales de Chimie et de Physique, Nov. 1857*) has made the interesting discovery, that Cinnabar, like Quartz, possesses not only a *positive* axis of double refraction—contrary to the statement of Sir David Brewster—but that it also exhibits circular polarization. As in the case of Quartz also, the latter phenomenon in different specimens is left-handed or right-handed respectively; whilst in plates cut from twin or interpenetrated crystals, two kinds are simultaneously present. These facts are the more curious, as no traces of hemihedral modifications have yet been detected in Cinnabar.

BRACHIOPODA.

The synoptical view, given below, of the classification groups and principal genera of the Brachiopods, may prove useful to some of our readers. It may be mentioned briefly, that the Brachiopods differ essentially from the Lamellibranchiata, or ordinary acephalous molluscs, by their organs of respiration. The lamellibranchiate mollusc in its adult condition possesses, as breathing organs, two pairs of bi-laminated gills or branchiæ; whilst in the brachiopod, respiration is effected by the veined and ciliated lobes of the mantle. The coiled and ciliated arms of the Brachiopoda (from which the order derives its name) appear to be destitute of the large veins of the mantle-lobes, and hence to take no direct part in the respiratory process. They are supported in many genera by a calcareous loop or special framework attached to the inside of the smaller or entering valve; but in many

* A species of *Pleuracanthus* (*P. tuberculatus*) has also been cited by Eichwald from the Devonian rocks of Russia; and another Devonian form (*P. laciniatus*) by F. Roemer, from the Hartz. These species, however, like many others based on fragmentary evidence, should probably be regarded at present as merely nominal.—E. J. C.

genera this framework is wanting. The coiling of the arms—the mode of which varies in the different families—gives a larger amount of surface, than would otherwise result, for the development of the cilia (or ciliated cirri) with which they are clothed. In the living species unprovided with internal shelly processes, they are more or less extensible, and this was probably the case also with regard to the extinct forms similarly constituted. In the species, however, in which these shelly processes were present, the arms were undoubtedly incapable of protrusion beyond the shell. Besides which, the mode of articulation of the valves, in the generality of cases, is such as to prevent the opening of the shell to any extent. The shell itself—equilateral in form, but with unequal valves—is traversed in most genera by minute pores or tubular prolongations probably connected with respiratory functions, although in the family of the Rhyneconellidæ, as well as in certain spirifers, &c., these pores are not observable. The shell is then said to be impunctate. The fossil brachiopods were attached to sub-marine objects by a pedicel or bysæus passing through an opening in one of the valves—or, in some genera, by the direct surface of the larger valve; otherwise they existed as free shells. Whether fixed or free, however, the brachiopods in the adult condition possess no powers of locomotion.

The Brachiopoda admit of being grouped in two sub-orders: 1. Brachiopoda proper; and, 2. Rudistes. There is at present a strong disposition to class the latter with the Lamellibranchiata, placing them near the Chamidæ: a view supported especially by Deshayes, Davidson, Bayle, and Woodward, in opposition to the opinion of Goldfuss, d'Orbigny, Pietet, McCoy, Philippi, and other observers. The question is still an open one—perhaps eventually to be settled by raising the Rudistes to the rank of a distinct order intermediate between the true brachiopoda and the ordinary acephala. The perforated shell-structure, (although not in all cases detected), the conformation of the hinge, and the mode of growth of the shell, are among the more salient characters which separate the Rudistes from these latter. Some very able papers, by Bayle and others, taking the lamellibranchiate view, may be seen in the thirteenth and fourteenth volumes of the Bulletin de la Société Géologique de France. In the annexed distribution the Brachiopoda proper are alone considered.

TABLE I.—Families of the Brachiopoda.

No true articulation by hinge-teeth.	{ Shell: thin, horny, { Shell: thick, calcareous,	{ Neither valve perforatedLingulidæ. { Slit or Foramen in one valveDiscinidæ. { Area wanting, or obscure.....Craniidæ. { Area largely developedCalceolidæ.
Valves articulated by hinge-teeth.*		

* In the Productus type of the Orthisidæ this character is sometimes obscure.

The relation of these families might be better shown by the following arrangement—the thick-shelled crania being evidently somewhat related to the Thecidæ as well as to the hingeless types which precede it in the grouping. Calceola stands apart, although with much that connects it, as an aberrant form, to the Orthisidæ. The Thecidæ—in many respects, aberrant types of the Terebratulidæ—form a transition-group to the Rudistes. See, further, the remarks at the close of Table II.

Lingulidæ.	
Discinidæ.	
	Craniadæ.
	Calceolidæ.
Orthisidæ,	
Spiriferidæ.	
Rhynchonellidæ.	
Terebratulidæ.	
	Thecidæ.

TABLE II.—Genera of the Brachiopoda.

- Lingulidæ*:—Shell corneous, or sub-corneous: nearly equivalve; hingeless; no true perforation.
 Oblong, horny:—*Lingula* (including *Glossina*, Phillips). Lower Silurian, upwards.
 Orbicular or sub-orbicular*; calcareo-corneous:—*Obolus* (*Ungula*, Pander; *Aulonotreta*, Kutorga). Silurian.
- Discinidæ*:—Shell corneous, or sub-corneous; hingeless: longitudinal slit or foramen in one valve.
 Shell impunctate:—*Discina* (*Orbicula*, including also *Orbiculoidea*, d'Orb, the *Schizotreta* of Kutorga). Lower Silurian, upwards.
 Shell with surface punctures:—*Trematis* (*Orbicella*, d'Orbigny). Silurian.
 Shell coarsely punctured and spiny:—*Siphonotreta*. Silurian.
 Appendix:—*Acrotreta*, Kutorga. Allied, according to Morris, to *Cyrtia*, in Family of the *Spiriferidæ*.
- Craniadæ*:—Shell thick; hingeless; orbicular; punctate; without foramen.
Crania (including *Pseudocrania*, McCoy). Silurian, upwards.
 Appendix:—*Spondylobolus*, McCoy.
- Calceolidæ*:—Shell thick, fibrous. Receiving valve large and conical. Hinge-line straight, with row of obscure teeth.
Calceola. Devonian.
- Orthisidæ*:—No internal shelly process: shell punctate; hinge-line straight.
- § 1. Shell bi-convex, or plano-convex; with area and foramen†. Greatest width generally below the hinge-line.
 Triangular foramen; no deltidium:—*Orthis*. Silurian to Carb. (or Permian?)
 This genus includes many so-called Spirifers and Terebratulidæ; and also, in part, *Orthambonites* and *Gonambonites* of Pander, and *Dicælosia*, *Platystrophia*, and *Schizophoria* of King.
 Round foramen, unless closed by age; deltidium (or pseudo-deltidium):—*Orthisina* (*Pronites*, *Hemipronites*, Pander; *Streptorhynchus*, King). Silurian to Permian.

* McCoy and other palæontologists place some species of *Obolus* under *Lingula*—thus making orbicular as well as oblong lingulæ.

† Sometimes closed or rendered obscure by age.

§ 2. Shell concavo-convex, generally depressed; widest at hinge-line; narrow area, with deltidium or pseudo-deltidium; no spines. Beak of receiving valve often perforated by a minute foramen.

Strophomena (including *Leptæna*. Also *Leptagonia*, McCoy; *Peridiolithus*, Hüpsch; *Enteteles*, Fischer; *Plectambonites* and *Gonambonites*, in part, Pander; *Strophodonta*, Hall). Many palæontologists—McCoy, d'Orbigny, Pictet, &c.—separate *Strophomena* and *Leptæna* as distinct genera; but the opening in the beak of the former is often closed, and the curvature of the valves appears to be a character of uncertain value. Some species of *Leptæna* also, have a small foramen at the beak of the receiving valve.

Appendix:—*Davidsonia*, Bouchard, *Tropidoleptus*, Hall.

§ 3. Shell concavo-convex, with tubular spines.

Spines placed irregularly; area very narrow or obscure:—*Productus*, Silurian to Permian.

Spines placed irregularly; area broad, with pseudo-deltidium:—*Strophalonia*, King. (*Aulosteges*, Helmersen; *Orthothrix*, Geinitz. Including also King's *Leptænalosia*). McCoy makes this a sub-genus of his *Leptæna*. Devonian to Triassic.

Spines on hinge-margin of receiving valve only: *Chonetes*. Silurian to Permian.

Spiriferidæ:—Shell with internal spiral processes pointing outwards.

§ 1. Hinge-line more or less straight, with well-developed area but no deltidium.

Shell impunctate; opening triangular, slightly trenching on the entering valve:—*Spirifer* (*Delthyris*, Dalman; *Choristetes*, Fisher? *Trigonotreta*, Kœnig). Silurian to Triassic.

Shell punctate; opening triangular, bordered, and confined to receiving valve:—*Spiriferina*, d'Orb. (Includes many so-called spirifers.) Jurassic—apparently confined to the Lias beds.

Shell punctate or impunctate, pyramidal; opening small, generally obscured or altogether closed by the large pseudo-deltidium. Area very large:—*Cyrtia*. Davidson proposes to place the punctate species under *Spiriferina*.

§ 2. Hinge-line curved. Area generally wanting, but a deltidium usually present. Whole shell more or less terebratuliform in its aspect.

Shell impunctate. Small opening, generally closed, at extremity of beak. No deltidium. Area indistinct, or wanting:—*Athyris* (*Spirigera* d'Orb.; *Cleiothyris*, King). Silurian to Triassic.

Appendix:—*Merista*, Suess; *Meganteris* (?) Suess.

Shell impunctate, and much like *Athyris*, but with a deltidium of two united pieces, although this is often concealed:—*Spirigerina* (*Atrypa*, Dalman; *Cleiothyris*, Phillips; *Hipparionyx*, in part, Vanuxem). Silurian, Devonian.

Shell punctate, a round foramen at beak, and small triangular area:—*Retzia*. Silurian to Carboniferous (or Triassic?). Externally, this genus cannot be distinguished from many *Terebratulæ*.

Shell impunctate, with long incurved beak. No area, but large concave deltidium:—*Uncites* (*Gypidia*, in part, Dalman). Devonian.

Rhynconellidæ:—Shell impunctate, with slight internal processes. Hinge-line curved. Area wanting, or very narrow. Spiral arms in living species of *Rhynconoella* directed downwards and inwards.

No area. No internal septa. Incurved beak, small:—*Rhynconella*. (Including *Atrypa* of d'Orbigny, Pictet, &c.; also d'Orbigny's *Hemithyris* and *Acanthothyris*; with *Cyclothyris* of McCoy, &c.) Silurian, upwards. The so-called *Atrypæ* included here, are taken from the genus *Spirigerina*—comprising the forms without internal calcareous processes or perforation at beak.

No area. A septum in each valve:—*Camerophoria*, King. Carboniferous, Permian. Perhaps better placed as the type of a sub-group under *Pentamerus*.

No true area. Receiving valve divided by internal septa into three chambers. A large incurved beak:—*Pentamerus* (*Gypidia*, in part, Dalman). Silurian to Carboniferous.

A narrow area, and small foramen. Obscure internal septa:—*Porambonites*. (*Isorhynchus*, King). Lower Silurian. Placed by McCoy, on account of the area, in the family of the *Orthisidæ*.

Terebratulidæ:—Shell punctate. Entering valve with internal shelly loop.

Shell with prominent internal septa. Brachial support large and more or less complicated. Area; deltidium of two pieces; and triangular or round foramen:—*Silnogocephalus*. Devonian. Distinguished from *Pentamerus* by its punctured shell, area, deltidium, &c. Closely allied to the next genus, *Terebratella*.

Shell with internal septum, and double loop. Area and foramen: the latter truncating in part the beak of the receiving valve. Hinge-line nearly straight:—*Terebratella*. (*Rhynchora*, Dalman; *Magellanica*, Chemnitz; *Delthyridia*, McCoy; *Trigonosemus*, Kœniz; *Terebrirostra*, *Fissurirostra*, d'Orb.; *Magas*, Sow; *Lyra*; *Bouchardia*, *Morrisia*, *Kraussia*, *Kingena*, Davidson; *Ismenia*, *Megerlia*, King). Triassic (?) upwards.

Internal septum absent, or more or less rudimentary. No area. Hinge-line arched. Beak truncated by circular foramen:—*Terebratula*, including *Terebratulina*, d'Orb.; *Epithyris*, Phil.; *Eudesia* and *Waldheimia*, King. The latter are aberrant types approaching *Terebratella*. Devonian, upwards.

Appendix:—*Seminula*, McCoy (*Epithyris*, King). Palæozoic *Terebratulæ*, without any deltidium.

Shell thick, with one or more sub-marginal septa in entering valve. Hinge-line straight. Foramen large:—*Argiope* [(*Megathyris*, d'Orb.) Cretaceous, upwards.

Thecidæ:—Shell, thick, punctate; with complicated internal processes and granulose margins. No foramen. (Attached by beak):—*Thecida*. Triassic—upwards.

D'Orbigny and McCoy place the Family of the *Thecidæ* amongst the *Rudistes*; whilst many palæontologists suppress it as a family, and arrange *Thecida* with the *Terebratulidæ*. Pictet, in the last volume of his *Palæontologie* (2nd ed.) issued a few months ago, separates it again from the latter, to place it between *Terebratulidæ* and *Spiriferidæ*. Its true position, however—passing from lower to higher

forms*—is evidently at the close of the series, as a transition-group to the Rudistes. This position, and the general arrangement of the families and genera as given above, has been adopted by the writer in his lectures during the last three or four years.

E. J. C.

MATHEMATICS AND NATURAL PHILOSOPHY.

MOSEK'S IMAGES AND A NEW ACTION OF LIGHT.

In the year 1842, Professor Moser, of Königsberg, called attention to an interesting class of phenomena, to which his name has since been attached, under the title of "Moser's Images," although Dr. Draper, of New York, had, two years previously, announced his observation of similar facts. If a wafer or piece of money is laid on a plate of glass, and the glass breathed upon; then, after the breath has evaporated, and the object has been removed from the plate, although the eye can detect no trace, a renewed breathing will cause the spot where it rested to become visible. If the coin be breathed upon and laid upon the plate, and a few seconds be suffered to elapse, on removing the coin, although as before no trace can be perceived, on breathing on the plate, the image of the coin will be produced in minute detail. At first M. Moser was inclined to attribute these effects to differences of temperature, as he found that on placing the coin on a heated silver plate, the same effect was produced; and, also on reversing the experiment by placing a heated coin on a cold plate. He also found that, instead of the breath, the vapors of mercury, iodine, chlorine, and the like could be used; and thus he drew the general conclusion that "when a polished surface is put in contact with a body of different temperature, it acquires the faculty of condensing on portions of itself all kinds of vapors, and of fixing them either by adhesion or chemical combination." He however abandoned this hypothesis as too limited, and announced that mere contact, independently of difference of temperature, was sufficient to produce the effect, and he was thus able to imitate the action of light on the Daguerrian plates in profound darkness, and obtained images of various objects, laid on an iodised silver plate, in darkness, by afterwards subjecting the plate to mercurial vapor, or to the sunlight. Extending his researches, he found that the iodising of the plate was not essential to the photographic process of Daguerre; and that sunlight was capable of making an impression on polished plates of different kinds, which could be reproduced at pleasure by subjecting them to various vapors. Thus, placing a black screen out of which figures had been cut, before a well polished silver plate, and exposing it to sun-light, the figures were perfectly defined when the mercurial vapor was applied to the plate. When a plate of glass was similarly exposed, the breath alone was sufficient to render the figures visible, and they could be made to reappear at pleasure, even after a very long interval of time. Hence M. Moser inferred that "light acts on all substances, and its action can be rendered visible by aid of any vapor which adheres, or can be chemically combined with the substance," and of this general proposition, the

* Some Zoologists place the Brachiopoda higher in the scale than the Lamellibranchiata. The gradual assumption, however, of foot and branchiæ in the development of the latter, would appear to be opposed to this view.

grand discovery of Daguerre would be only a particular case. Still extending his researches, M. Moser was led to a still more general inference, and the following may be taken as the type of the experiments leading thereto. A plate of agate on which had been engraved various figures, was placed at a distance of half a millimetre, in darkness, over a silver plate. After a few seconds, the plate was exposed to mercurial vapor, and a distinct image of the figures was the result. Hence he inferred the following proposition: "Any two bodies placed sufficiently near each other mutually impress one another with their own image." For the physical explanation of these phenomena, M. Moser was led to assert that all bodies are self-luminous, and that they contain latent light correspondingly to latent heat. He seems in this to have been seduced by a tempting but imperfect analogy, and his views have not met with acceptance. Still more unfortunate, Dr. Draper imagined that the results were produced by a new quality of light, to which he gave the name of Tithonicity, but further researches by Snorr and R. Hunt, seemed to show that the active agent in the production of these images was *heat*, and under the name of Thermography, a new art was thus instituted, in the prosecution of which much success has been attained by various experimenters. The following strange and singular experiments by M. Nièpee de St. Victor, which have just appeared, decisively demonstrate that the conclusion above accepted by the scientific world is far too limited, and that bodies possess the power (somewhat allied to the known phenomena of phosphorescence) of giving out light absorbed by them, and even of retaining this power for indefinite periods. The memoir was communicated to the Académie des Sciences, by M. Chevreul, and the following extracts are taken from a translation in the current number of the London Photographic Journal:

Will a body which has been subjected to the influence of light or insolation, preserve in darkness any effects (impression) of this light?

Such is the problem that M. Nièpee attempted to resolve by means of photography. The phosphorescence and fluorescence of bodies are known, but the following experiments have never been made until now. An engraving which had been kept for several days in darkness was exposed during a quarter of an hour to the action of direct solar rays, one half being covered with an opaque screen. The engraving was then laid upon a sheet of very sensitive photographic paper, and put in a dark place for twenty-four hours, and on being examined, it was found that the white portions of the engraving which had not been protected by the screen during its exposure to the sun, had been reproduced in black. When the engraving was kept in profound darkness for several days, and then applied to the paper without being previously exposed to the sun, no result was produced.

Certain engravings after being exposed to the action of light reproduce themselves better than others, according to the nature of the paper; but all papers, even Swedish filtering-paper with or without water-mark, reproduce themselves more or less after a preliminary exposure to the light. Wood, ivory, gold-beater's skin, parchment, and even the living skin, are also perfectly reproduced under the same circumstances; but not so metals, glass, and enamels. In exposing an engraving to the solar rays for a very long time, it becomes, if one may use the term, saturated with light. In this way it produces the maximum of effect, provided that it is suffered to remain in contact with the sensitive paper, in darkness, for two or three days.

If a sheet of glass be interposed between the engraving and the prepared paper,

no impression is produced. It is the same if a sheet of mica be substituted for the glass, or a sheet of rock crystal, or a yellow glass coloured with the oxide of uranium. An engraving covered with a layer of collodion or gelatine is reproduced but not if it be covered with picture-varnish or gum.

An engraving placed at a distance of three millimetres from the prepared paper is reproduced very well, and if it be a bold design, it is reproduced at a distance of one centimetre. The reproduction therefore is not the result of contact or chemical action. All the parts of an engraving colored with different colors are not produced with the same intensity; they vary according to the chemical composition of the colors: the same may be said of different kinds of inks. Vitrified characters traced upon a plate of varnished or enamelled porcelain are reproduced, but the porcelain leaves not the faintest trace; but if the porcelain be free from varnish or enamel, it leaves an impression, though a faint one.

If, after having exposed an engraving to the light for an hour, it is placed in contact with a piece of pasteboard which has been kept in a dark place for some days previously, and at the expiration of not less than twenty-four hours the pasteboard be brought into contact with the prepared paper, and allowed to remain thus for another twenty-four hours, the result will be the reproduction of the engraving—a little fainter, it is true, than if the engraving had been applied directly, but still distinct. Likewise if a tablet of black marble dotted with white spots be exposed to the light, and then applied to the prepared paper, the white spots alone will produce an impression. Under the same conditions, a tablet of white chalk will leave a visible impression, whereas one of black charcoal makes none whatever. A black and white feather exposed to the sun, and applied in the same manner, produced the same results.

The author drew particular attention to the following experiment, which is perhaps the most curious and the most important. He took a metal tube (any other opaque substance in the form of a tube answers the same purpose) closed at one of its extremities, and lined with white paper or cotton, and exposed the open end to the direct solar rays for about an hour; after the insolation he applied the same end to a sheet of prepared paper, and found after the lapse of twenty-four hours that the area covered by the tube had been darkened. More than that, an engraving on Chinese paper interposed between the tube and the prepared paper, was itself reproduced.

If the tube be hermetically closed immediately on being withdrawn from the light, it will preserve for an indefinite period the power of radiation communicated to it by insolation.

A piece of white card placed in a dark room into which an image vividly illuminated by the solar rays was thrown, was found after a three hours' exposure to give a faint representation of the object upon the prepared paper, after twenty-four hours' contact.

It remains only to speak of the result of experiments made with fluorescent and phosphorescent bodies:—A design traced upon a sheet of paper with a solution of sulphate of quinine (one of the most fluorescent bodies known,) and exposed to the sun, then placed in contact with the prepared paper, will reproduce itself in a much more intense black than the paper on which it is traced. A sheet of glass, however, placed between the design and the prepared paper, prevents

any impression from being produced, nor will any impression be produced if the design be not exposed to the action of the sun previous to contact.

A luminous design traced with phosphorus upon a sheet of white paper, will, without previous exposure to the light, act very quickly upon the prepared paper, but not through glass.

M. Nièpce concludes his paper, which was received with lively interest by the Academy, thus :—"Such are the principal facts I have observed. I have not space to enumerate all the experiments I have made; there are many others to be made; therefore I hasten to publish this paper without waiting to complete it. I may be permitted I hope, to believe that my new discoveries of the properties of light, scarcely suspected or imperfectly verified up to the present, will excite the attention of natural philosophers and lead to important results."

J. B. C.

MISCELLANEOUS.

Dr. Charles Mackay, in his tour through the States, continues to receive a most cordial and hearty welcome; and in his own genial way, responds in equally well-set prose and rhyme, to the friendly greetings of his American hosts. On the 14th of January he was entertained at a public dinner at Washington, where distinguished senators, and representatives of American Literature, united to give brilliancy and interest to the reception of the British Poet. In return for a welcome so gracious and friendly, Dr. Mackay repaid them in full, in the currency of Parnassus. General Shields, who presided, having proposed, in a few graceful and appropriate remarks, a sentiment of welcome to their guest, instead of responding in the established common-places of prose, and declaring "the present the proudest moment of his life!" &c., &c., Dr. Mackay delighted the company by reciting the following humorous and genial poem, embodying a pleasant allegory of the first fruits of the anticipated triumph of science, in the successful completion of the submarine Atlantic Telegraph:

JOHN AND JONATHAN.

Said brother Jonathan to John,
 "You are the elder born,
 And I can bear another's hate,
 But not your slightest scorn.
 You've lived a life of noble strife,
 You've made a world your own,
 Why, when I follow in your steps,
 Receive me with a groan?"

"I feel the promptings of my youth,
 That urge me evermore
 To spread my fame, my race, my name,
 From shore to furthest shore.

I feel the lightnings in my blood,
 The thunders in my hand,
 And I must work my destiny,
 Whoever may withstand.

“ And if you'd give me, brother John,
 The sympathy I crave,
 And stretch your warm fraternal hand
 Across the Atlantic wave,
 I'd give it such a cordial grasp
 That earth should start to see,
 And ancient crowns and sceptres shake
 That fear both you and me.”

Said brother John to Jonathan,
 “ You do my nature wrong;
 I never hated, never scorned,
 But loved you well and long.
 If, children of the self-same sire,
 We've quarrelled now and then,
 'Twas only in our early youth,
 And not since we were men.

“ And if with cautious, cooler blood,
 Result of sufferings keen,
 I sometimes think you move too fast,
 Mistake not what I mean.
 I've felt the follies of my youth,
 The errors of my prime,
 And dreamed for you—my father's son—
 A future more sublime.

“ And here's my hand, 'tis freely given,
 I stretch it o'er the brine,
 And wish you from my heart of hearts
 A higher life than mine.
 Together let us rule the world,
 Together work and thrive;
 For if you're only twenty-one,
 I'm scarcely thirty-five.

“ And I have strength for nobler work
 Than e'er my hand has done,
 And realms to rule and truths to plant
 Beyond the rising sun.
 Take you the West and I the East,
 We'll spread ourselves abroad,
 With trade and spade, and wholesome laws,
 And faith in man and God.

“Take you the West and I the East,
 We speak the self same tongue
 That Milton wrote and Chatham spoke
 And Burns and Shakespear sung;
 And from our tongue, our hand, our heart,
 Shall countless blessings flow,
 To light two darkened hemispheres
 That know not where they go.

“Our Anglo-Saxon name and fame,
 Our Anglo-Saxon speech,
 Received their mission straight from Heaven
 To civilize and teach.
 So here's my hand, I stretch it forth;
 Ye meaner lands look on!
 From this day hence there's friendship firm
 'Twixt Jonathan and John!”

They shook their hands, this noble pair,
 And o'er the “electric chain”
 Came daily messages of peace
 And love betwixt them twain.
 When other nations, sore oppressed,
 Lie dark in sorrow's night,
 They look to Jonathan and John
 And hope for coming light.

CANADIAN INSTITUTE.

SESSION—1857-58.

FIRST ORDINARY MEETING—5th December, 1857.

Professor E. J. CHAPMAN, Vice-President, in the Chair.

I. *The following Gentlemen, provisionally elected by the Council during the recess, were Balloted for and declared duly elected Members:*

J. ARDAGH, M.D., Orillia, C.W.

R. BARRETT BERNARD, Esq., Barrie, C.W.

THOS. HECTOR, Esq., C.E., Toronto.

W. A. WATTS, M.A., Toronto.

II. The donations to the Library and Museum received since the last ordinary meeting were announced. The thanks of the Institute were voted to the donors, and detailed lists, with the Donor's names, were ordered to be inserted in the Annual Report of the Council.

III. *The following Papers were read:*

1: By Sir W. E. Logan, F.R.S.:

“On the relative dates of various intrusive rocks cutting the Laurentian series in Canada West.”

2. By B. O'Hara, Esq. :
"On a new form of application of Propelling power to Steamships."
3. By Prof. Wilson, LL.D. :
"On some Ethnographic phases of Conchology,"

SECOND ORDINARY MEETING—12th December, 1857.

Professor E. J. CHAPMAN, Vice-President, in the Chair.

I. *The following Gentlemen were elected Members :*

ALEXANDER MARLING, Esq., Toronto.
 FARQUHAR MCGILLIVRAY, Esq., B.A., Cornwall, C.W.
 NEIL McLEAN TREW, Esq., B.A., Windsor, C.W.
 THOS. G. M. COTTLE, Esq., Toronto.

II. *The following donations for the Museum were announced, and the thanks of the Institute voted to the donors :*

1. Anonymus.
A Bird's Nest of remarkable construction, from the neighbourhood of Calcutta.
2. From C. Rankin, Esq., per A. Russell, Esq.
A piece of Elastic Sandstone from Delhi.

III. *The following Papers were read :*

1. By the Rev. Professor W. Hincks, F.L.S. :
"Notices respecting the Flora of Western Canada, and especially of the neighbourhood of Toronto."
2. By the Rev. J. McCaul, LL.D. :
"Notes on Latin Inscriptions found in Britain." Part I.

IV. The requisite nominations of office-bearers for the ensuing year were made, and the Vice-President announced the Annual General Meeting to be held on the 19th inst., to receive the Report of the Council, elect the Officers and Members of Council for the ensuing year, and for other business.

ANNUAL GENERAL MEETING—19th December, 1857.

Professor E. J. CHAPMAN, Vice-President, in the Chair.

I. The Report of the Council for the year 1856-57, was read as follows :

ANNUAL REPORT OF THE COUNCIL, 1857.

THE Council of the Canadian Institute, in fulfilment of the duty devolving upon them at the expiration of their year of office, have the honor to lay before the Members the following Report, embodying a statement of the present condition of the Institute, and of its proceedings during the past Session.

In submitting this Report, the Council have much pleasure in being able to call attention to the very satisfactory condition of the Institute generally.

The constant accession of new members, the numerous and valuable donations presented to the Library and Museum, the comparatively large and increasing attendance at the Meetings of the Session, the character of the Papers communicated at these Meetings, and finally, the continued success of the Journal of the Institute, are each and all, it is submitted, legitimate subjects of congratulation ;

showing, as these facts most assuredly do, the honorable position accorded to the Institute in the estimation of the Province.

The following statement exhibits the alteration in the Roll of Membership:—

Number of Members at the commencement of present Session.....	575
New Members elected during the Session.....	50
“ “ by Council during the Recess	4— 54
	629
Members deceased, 4: left the Province or withdrawn	11— 15

Total number now on the books of the Institute614

Although the increase in the number of Members is below that of the last Session, it is still sufficiently large to be deemed satisfactory; being, in fact, considerably above the average annual returns of many of the long incorporated and most successful Societies of Europe.

In the following list, an enumeration is given of the various works added to the Library by purchase during the past year:—

BOOKS PURCHASED FOR THE LIBRARY.

Books marked (*) are in parts, or unbound.

- Encyclopædia Britannica. Vols. XI., XII, XIII. and Supplement.
 Notes and Queries. Vol. I., 2nd Series. January to June, 1856.
 Orr's Circle of the Sciences—Practical Chemistry.
 Earl Stanhope's (L. Mahon's) History of England. Vols. V., VI. and VII.
 Hugh Miller's Testimony of the Rocks.
 Morton's Crania Americana.
 Morton's Crania Ægyptiaca; or Observations on Egyptian Ethnography.
 Johnson's Physical Atlas. Imperial folio. Enlarged edition, 1856.
 Crania Britannica. Decades I. and II.
 Blodget's Climatology of the United States.
 Indigenous Races of the Earth; or New Chapters of Ethnological Inquiry.
 History of Civilization in England. By H. T. Buckle, 1857. Vol. I.
 Memoirs of Sir Isaac Newton. By Sir David Brewster. 2 vols.
 Visite à l'exposition universelle de Paris en 1855.
 Monumenta Historica Britannica.
 Edgar A. Poe's Miscellaneous Works. 4 vols.
 Arago's Biographies of Distinguished Men.
 Marryat's Pottery and Porcelain.
 Life of George Stephenson.
 Schoolcraft's Iroquois Indians.
 Gray's Botanic Text Book.
 Gray's Manual of Botany.
 Westwood on Insects. 2 vols.
 Herring on Paper Making.
 Gosse's Canadian Naturalist.
 Memorials of A. Crosse, Electrician.
 Fairbairn's Information for Engineers.
 Schoolcraft's Thirty Years with the Indian Tribes.
 Masson's Essays on English Poets.

Carpenter on the Microscope.
 Lindley's Vegetable Kingdom.
 Ruskin's Seven Lamps of Architecture.
 Catlin's North American Indians. 2 vols.
 Lardner's Works—Natural Philosophy. 3 vols.
 Lardner's Astronomy. Vol. I.

*Tobacco: Its History and Cultivation.

Architectural Publication Society:—

Illustrations. 5 Vols., 1848-54. Parts I. and II. Vol. 6.
 Architectural Dictionary.

**Quarterly Journal of the Geological Society*:—

Vols. XII. XIII. Parts, Nos. 47-49-51.

**Quarterly Journal of the Chemical Society*:—

Vols. IX. X. Parts, Nos. 35-37.

**Quarterly Journal of Microscopic Science*:—Nos. 17-21.

**The London, Dublin, and Edinburgh Philosophical Magazine and Journal of Science*:—Vols. XII. XIII. Nos. 78-93.

**Edinburgh New Philosophical Journal*: Vols. IV. VI.

**The Chemical Gazette*:—Nos. 321-359.

Amongst the valuable donations made to the Library during the past Session, the Council cannot refrain from alluding more particularly to Gould's magnificent work on the Trochilidae, presented to the Institute by the liberality of one of its late Presidents, G. W. Allan, Esq., to whom the Institute is also in other respects so largely indebted. The best thanks of the Institute are likewise again due to the Hon. J. M. Brodhead of Washington, H. G. Bohn, Esq., of London, and other well-wishers, for their acceptable contributions, as recorded in the annexed list:—

DONATIONS TO LIBRARY SINCE LAST REPORT.

Those marked * are in parts, or pamphlets, and unbound.

FROM OFFICE OF ROUTINE AND RECORDS—PROVINCIAL GOVERNMENT.

- *Return to an address of the Legislative Assembly, 5th May,—in reference to Purchase of Water and Beach Lots at Quebec.
- *Public Accounts for year 1856.
- *Annual Report of the Postmaster General, 1856.
- *Report of the state of the Militia of the Province, 8th January, 1857.
- *Report of Count De Rottermund on the Mines of Lake Superior and Huron.
- *Report of Commissioners of Inquiry in re Corrigan Murder, July, 1857.
- *Summary of the Proceedings of the Legislative Assembly of Canada, 3rd Sess., 5th Parliament, 1857, from 26th February to 10th June.
- *Extract from Return to an Address, &c., to report on Quebec and Point Levi Roads. Canada at the Universal Exhibition 1855, Paris. Two copies.

FROM THE TRUSTEES OF THE NEW YORK STATE LIBRARY.

- *Annual Report of the Trustees. New York State Library, 22nd January, 1856.
- *Science and Religion—M. Hopkins, D.D.
- *Religious bearings of Man's Creation—E. Hitchcock, D.D. Two copies.
- *Eulogy on the Life and Character of Dr. T. R. Beck.
- *Index to the Laws of the State of New York, 1842 to 1855 inclusive—Bogart.

- *Inauguration of the Dudley Observatory, Albany.
- *Relations of Science and Religion—Discourse delivered before the American Association by Rev. J. H. Hopkins, D.D., LL.D., 1856.
- *Tenth Annual Report of the Regents of the University of the State of New York, &c.

New York State Library Catalogue, in two Vols.

New York State Library Catalogue, No. 3, Maps, Manuscripts, Medals, &c., 1856.

New York Meteorology, 1826 to 1850—Hough.

Documents relating to the Colonial History of the State of New York—Holland Documents, 1603-1656—E. B. O'Callaghan, M.D., LL.D. Vols. I. III. IV. and VII.

Documents relating to the Colonial History of the State of New York. Edited by E. B. O'Callaghan, M.D., LL.D. Vol. VIII.

FROM THE BUREAU OF AGRICULTURE.

Essay on the Insects and Diseases injurious to the Wheat Crops. By H. Y. Hind, Esq., M.A., Prof. of Chemistry, Trinity College, Toronto. Two copies.

FROM CHIEF SUPERINTENDENT OF EDUCATION, UPPER CANADA.

*Report on Education in Upper Canada, omitting the Statistical Tables and Appendix.

*Journal of Education for the year 1857. Two sets.

FROM CHIEF SUPERINTENDENT OF EDUCATION, LOWER CANADA.

*Journal of Education, for the year 1857. Two sets.

*Journal de l'Instruction Publique, do. do.

FROM OFFICE OF CANADA GAZETTE.

Tables of the Statutes in Force, or which have been in Force in Upper Canada, in their Chronological Order, &c. &c., to the end of the Session, 1856.

FROM E. B. O'CALLAGHAN, M.D., LL.D.

Transactions of the American Institute from 1846 to 1854, inclusive.

FROM MESSRS. HARPER AND BROTHERS, NEW YORK.

Human Physiology, Statistical and Dynamical, or the Condition and Course of Man—By J. H. Draper, M.D., LL.D.

New Granada—By Isaac F. Holton, M.A., with Maps and Illustrations.

Beaumarchais and His Times—French Society in the 18th Century.

Lake Ngami—By Charles J. Anderssen.

Notes on Central America, with Maps and Illustrations—By E. G. Squier.

FROM MESSRS. DIX, EDWARDS & CO, NEW YORK.

Lake Ngami—By Charles J. Anderssen.

FROM F. W. CUMBERLAND, ESQ., TORONTO.

Memorials of Edinburgh in the Olden Time—By Daniel Wilson, F.R.S., S.A., &c. Two volumes.

FROM HON. J. M. BRODHEAD, WASHINGTON.

Map of the Strait of Mackinac, &c.—By Lt. Col. Kearney and Capt. Maccomb, 1849-51.

- United States Japan Expedition; Zodiacal Light, &c.—By Rev. G. James, A. M.
Vol. III.
- Patent Office Reports. 1855, Agriculture.
- Regulations for Consular Officers of the United States—Department of State, 1856.
- Report from the Register of the Treasury of the Commerce and Navigation of the United States for year ending 30th June, 1856.
- Report of the Secretary of the Treasury of the United States on the State of Finances for the year ending 30th June, 1856.
- Statistical Report on the Sickness and Mortality in the Army of the United States, from January 1839 to January 1855—Prepared by Brevet Brigadier General Thomas Lawson, Surgeon General United States Army, and R. H. Cooleidge, M.D., Assist. Surgeon United States Army.
- United States Naval Astronomical Expedition to the Southern Hemisphere during the years 1849-52. Vol. VI.
- Report of the Secretary of War, U. S., respecting the purchase of Camels for the purposes of Military Transportation, 1855-7.
- Report on the Commercial Relations of the United States with all Foreign Nations—E. Flagg, Superintendent. Vol. I. Digest, and Vol. III.
- Report of Decisions of the Commissioners under the Convention of February 8, 1853, between Great Britain and the United States, August 11, 1856.
- Report of the Commissioners of Indian Affairs accompanying the Annual Report of the Secretary of the Interior for the year 1856.
- Shells and Shell Guns—By J. A. Dahlgren, Commander in charge of Experimental Ordnance Department, Navy Yard, Washington.
- Report on Kansas Affairs—House of Representatives, July, 1856.
- Report of Explorations and Surveys to ascertain the most practicable and economical route for a Railroad from the Mississippi River to the Pacific Ocean, according to Acts of Congress, March 3, 1853, May 31, 1854, and August 5, 1854. Vol. II.
- General Regulations under the Revenue and Collection Laws of the United States Treasury Department, 1857.
- General Regulations, No. 54, under the Provisions of the Warehouse Laws, and for other purposes—Treasury Department, July 2, 1855.
- General Regulations, No. 67, under the Provisions of the Laws in relation to the Revenue, Marine, Consul and Commercial Agents, &c. &c.—Treasury Department, June 1st, 1856.
- General Regulations, No. 63. Abstract of Decisions on Questions submitted to the Treasury Department arising under the Laws affecting Revenue and Commerce in force since December 1, 1836, and under Treaty stipulations with Foreign Powers. Treasury Department, February 1, 1856.
- United States Japan Expedition—Com. M. C. Parry. Vol. II. With Illustrations.
- *United States Official Army Register, 1857.
- * " " Navy " 1857.
- Geology of Lake Superior Region. Parts I. and II.—Foster and Whitney.
- Report on the Geological and Mineralogical Survey of the Mineral Lands of the United States in the State of Michigan—By C. T. Jackson.

FROM MESSRS. D. APPLETON & Co., NEW YORK.

Milledulcia—A Thousand Pleasant Things selected from Notes and Queries.

FROM OBSERVATORY AT HARVARD COLLEGE.

*Annals of the Astronomical Observatory of Harvard College. Vol. I., Part 1.

FROM A. H. ARMOUR, ESQ., TORONTO.

*Montreal in 1856—Sketch prepared for the Celebration of the opening of the Grand Trunk Railway.

*Almanach de Gotha, 1856.

*Outlines of the Geology of Ohio—By C. Whittlesey, with Map.

*Natural History of Vermont—Lecture by Zadock Thompson.

*Preliminary Report on the Geology of Vermont.

Boston Business Directory, 1857.

FROM W. B. SULLIVAN, ESQ., TORONTO, AUTHOR.

*Sketch of the Montreal Celebration of the opening of the Grand Trunk Railway, 1856.

FROM THE AUTHOR, SIR G. SIMPSON.

Overland Journey Round the World—years 1841 and 1842.

FROM MESSRS. PHILLIPS, SAMPSON & CO., BOSTON.

History of the Reign of the Emperor Charles the Fifth. By W. Robertson, D.D. With additions by W. H. Prescott. Three vols.

Religious Truth Illustrated from Science, in Addresses and Sermons on special occasions. By Edward Hitchcock, D.D., LL.D., Professor of Geology at Amherst College.

Biographical Essays. By Henry T. Tuckerman.

FROM MESSRS. GOULD AND LINCOLN.

Annual of Scientific discovery, 1857.

FROM FRANKLIN INSTITUTE, PHILADELPHIA.

Report on the 25th Exhibition of American Manufactures, held in the City of Philadelphia, 11th to 29th Nov., 1856.

Journal of the Institute, for year 1857.

FROM H. G. BOHN, ESQ., LONDON, PER A. H. ARMOUR, ESQ.

Critical Essays, contributed to the Eclectic Review. By John Foster. Edited by J. E. Ryland, M.A. Vol. I.

History of the Conquest of England by the Normans; its causes, and its consequences in England, Scotland, and Ireland, and on the Continent. By Augustus Thierry. Translated, from 7th Paris Edition, by W. Hazlitt. Vols. I. and II.

History of Civilization, from the fall of the Roman Empire to the French Revolution. By F. Guizot. Translated by W. Hazlitt, in 3 vols. Vols. I. II. & III.

The Complete Angler; by Izaak Walton and Charles Cotton; with lives of the Authors. Edited by Ed. Jesse, and H. G. Bohn.

Blairs' Chronological Tables, revised and enlarged, to the Russian Treaty of 1856. By J. Willoughby Rosse.

Masterman Ready. By Capt. Marryat. With 93 engravings.

Lives and Works of Michael Angelo and Raphael. By R. Duppa and Q. de Quincy.

Memoirs of the Duke of Sully, Prime Minister of Henry the Great. In four vols,

- Quintilian's Institutes of Oratory—literally translated—by Rev. John S. Watson. M.A., M.R.S.L.
- The Natural History of Pliny. Translated by John Bostock, M.D., F.R.S., and H. T. Riley, Esq., B.A. Vol. V.
- Dictionnary of Latin Quotations, Classical and Mediæval; with a Selection of Greek Quotations. By H. T. Riley, B.A.
- Orations of Demosthenes, against Leptines, Midias, Androtion, and Aristocrates. Translated, with Notes, &c., by Charles Rann Kennedy.
- *The Crystal Palace Company, Deeds of Settlement, Royal Charter, and List of Shareholders, January, 1856.
- The Life of George Washington. By W. Irving. Vol. III. American War, Years 1777-1778-1779.

FROM THE SOCIETY OF ARTS, LONDON.

- *Address on the Opening of 103rd Session; delivered by Col. Sykes, F.R.S.
- **List of Officers and Committees, Parliamentary and of reference.
- Journal of the Society, for years 1856-7. Two copies.

FROM L. A. HUGUET LATOUR, ESQ., MONTREAL.

- *Twenty-eighth Annual Report of Natural History Society, Montreal, May, 1856.

FROM BOARD OF AGRICULTURE, UPPER CANADA.

- Transactions of the Board, for year 1856.

FROM SANDFORD FLEMING, ESQ., C.E., TORONTO.

- *Preliminary Report on the Projected North Western Railway of Canada.

FROM THOS. HENNING, ESQ., TORONTO.

- Villas and Cottages: a Series of Designs prepared for execution in the United States. By C. Vaux.

FROM G. W. ALLAN, ESQ., TORONTO.

- A Monogram of the Trochilidæ or Humming Birds. By John Gould, F.R.S. Fourteen Parts. (*To be continued.*)

FROM THE AUTHOR.

- Surnames. By B. Homer Dixon, Esq., Boston. For private distribution.

FROM MAJOR RAINS, ISLAND ST. JOSEPH.

- Il Decamerone di Messer Giovanni Boccaccio, 1789.
- Origine de Cavalieri di Francesco Sansovino. Venetia, 1566.
- L'Arcadia di Iacomo Sannazaro, di nuovo riveduta corretta et adornata di varie figure. 1599.

FROM LEGISLATIVE ASSEMBLY.

- Journals of Legislative Assembly. Vols. XII. to XV.
- Index to Vol. XIII., Appendices.
- General Index Journals of House of Assembly, Canada, 1841-1851.
- Canada at the Universal Exhibition, Paris, 1855. Translation.
- Statutes of Canada, 1857.

FROM MECHANICS' INSTITUTE, TORONTO.

- *Report of the General Committee, Annual Meeting, &c., 1857.

FROM CROWN LAND DEPARTMENT, PER A. RUSSELL, Esq., A.C.C.L.

*Report of the Commissioner of Crown Lands of Canada for the year 1856. 2nd Edition.

Appendix to Report of the Commissioner of Crown Lands, Part II. *Maps of Canada.*

FROM LEONARD SCOTT & Co., N. YORK, PER A. H. ARMOUR, Esq.

*Edinburgh, Westminster, North British, and Quarterly Reviews for 1857.

*Blackwood's Magazine do

FROM SECRETARY OF THE COMPANY.

*Illinois Central Railroad Company, &c.

*Reports and Accounts of do. to 31st December, 1856.

FROM THE AUTHOR, DR. MORRIS, TORONTO.

*Observations on the Construction of Hospitals for the Insane.

*A Theory as to the Proximate Cause of Insanity, &c.

FROM THE AUTHOR, THOS. HODGINS, B.A., TORONTO.

*The Canada Educational Directory and Calendar for 1857-8.

FROM THE AUTHOR, J. RORDANS, Esq., TORONTO.

*The Upper Canada Law Directory for 1857.

FROM G. P. URE, Esq., TORONTO.

An Argument, Legal and Historical, for the Legislative Prohibition of the Liquor Traffic, by Dr. F. R. Lees.

FROM THE AUTHOR, J. AITKEN MEIGS, M.D.

Catalogue of Human Crania in the Collection of the Academy of Natural Sciences Philadelphia, based upon Dr. Morton's Catalogue of Skulls, &c.

FROM THE PUBLISHER, JOHN LOVELL, Esq., MONTREAL.

Canada Directory for 1857-58.

FROM HON. EAST INDIA COMPANY.

Meteorological Register kept at the Hon. East India Company's Observatory at Madras, from years 1822-1843.

*Astronomical Observations made at the Hon. East India Company's Observatory at Madras, in the years 1813-1847; together with the recomputation of the Sun and Moon and Planetary Observations since 1831, by Thomas Glanville Taylor, Esq., F.R.S. and F.R.A.S., Astronomer to the Honorable Company.

*Ditto, by Capt. W. K. Worster, Artillery, F.R.A.S., Acting Astronomer, and W. Stephen Jacob, Esq., F.R.A.S., Astronomer to the Hon. Company for the years 1848-1852.

Also Two Plates, Jupiter and Mars.

FROM MAJOR GENERAL SABINE, R. A., PER PROF. CHERRIMAN, M.A.

Magnetical and Meteorological Observations made at Toronto, Canada, Vol. III, 1846-7 and 8, with abstracts to 1855, inclusive. By Major Gen. E. Sabine, R.A.

FROM SMITHSONIAN INSTITUTION, WASHINGTON.

Patent Office Reports, 1853-5, Agricultural, Mechanical, Vols. I. and II.

Do do 1854-5, Mechanics.

*Account of Smithsonian Institute, its Founder, Building Operations, &c. By W. S. Rhees.

Smithsonian Contributions to Knowledge, Vol. IX.

*Annual Report of the Board of Regents of the Smithsonian Institution, 1855-6.

*Catalogue of North American Mammalia in Museum of the Institute.

FROM THE SOCIETIES.

*Annale des Mines ou Recueil de Mémoires sur l'exploration des Mines et sur les Sciences et les Arts qui s'y Rapportent; rédigées par les Ingénieurs des Mines, et publiées sous l'autorisation du Ministre des Travaux Publics. Cinquième Série, Tomes VI.-X., 1854-56.

*Bulletin de la Société Géologique de France. Tomes XII.-XIV., 1855-56.

*Table Générale des Articles contenus dans le volume.

*Catalogue de la Maison Eloffe et Cie., Naturalistes, 24 pages.

*Notice Biographique sur M. de Boissy par M. D'Archiac.

*Notice sur la Vie et les Travaux de Jules Haimé par M. D'Archiac.

*Quarterly Journal of the Geological Society, England, 1856-57. No. 47-49.

*Journal of the Royal Geographical Society, Vol. XXVI., 1856.

*Address at Anniversary Meeting by Rear Admiral Beechy, V.P.R.S., 1856.

Proceedings of the Royal Geographical Society, 1857, Nos. VI.-IX.

*Journal of Geological Society of Dublin. Vol. I.—Parts 2, 3, and 4 (Part 1 deficient.) Vol. II.-VI., 1848-55. Vol. VII. One part, March, 1855.

*Transactions of the Literary and Historical Society of Quebec. Feb., 1856.

*Transactions of the Jamaica Society of Arts. Vols. I. and II., 1854-5 and 1856.

*Annals of the Lyceum of Natural History, New York. Vols. I. to V., and Parts I. to VII. of Vol. VI.

*Constitution and By-laws of the New Orleans Academy of Sciences, 1854.

*Proceedings of the New Orleans Academy of Sciences. Vol. I., March 1, 1854.

*Annual Address read before the New Orleans Academy of Sciences, February 25, 1856, by Prof. J. L. Ridell, University of Louisiana. Through L. A. Hinguet Latour, Esq., Montreal.

*Boston Natural History Society, Proceedings of. Pages 97 to 240.

*Queen's Bench Reports, per H. Rowsell, Esq.

PERIODICALS—BOUND AND ADDED TO THE LIBRARY SINCE LAST ANNUAL REPORT
33 Vols.

The number of Works belonging to the Library of the Canadian Institute amounts at present to nearly two thousand volumes. Many of these works consist of expensive and valuable books of reference; and as the entire Library has now been re-arranged and catalogued by the zealous exertions of Professor Croft, the Honorary Librarian appointed at the last election of Officers, it affords to Members a readily available source of information—of a character not likely to be found in ordinary libraries—on various subjects of both special and general interest. It may not be amiss to repeat here, as stated in the last Report, that a book has been opened, in which Members can enter the title of any work they may wish to recommend to the Council for purchase.

The specimens presented to the Museum of the Institute since the date of the last Report, are enumerated in the following list:

DONATIONS TO THE MUSEUM.

FROM JOHN HEAD, ESQ., TORONTO.

Large Stone Gouge, dug up in Canada West.

FROM PROFESSOR HIND, M.A.

A Trilobite Bed—Utica Slate from the Blue Mountains, Collingwood.
 Graptolite Bed—Hudson River Group, from Humber River, near Toronto.
 Fucoid and Ripple Marks,—Hudson River Group, Humber River.
 Black River and Birds-eye Limestone, from Lake Couchiching.
 Tracks of Crustacea—Potsdam Sandstone, Beaubarnois.
 Large Single Trilobite.

FROM MAJOR F. WELLS, 1ST ROYAL REGIMENT.

A Stone Hammer picked up in the third parallel, left attack, of the Trenches of Sebastopol, about three feet six inches under ground.

FROM MAJOR RAINS, ST. JOSEPH'S ISLAND, C.W.

Greek Coins, Silver, 10; Brass, 36.....	46
Roman Coins, Silver, 61; Brass, 53.....	114
Mediæval and Modern Coins, Gold, 1; Silver, 40; Copper, 72	113
Brunel Medal	1
Total.....	274

Specimens of Lapis Lazuli, Copper, and Copper Ore, from Bruce Mines.

FROM ANGUS McINTOSH, ESQ., PER J. THOMPSON, ESQ.

Several specimens of Copper Ore and Virgin Copper, &c., viz. :
 Five specimens—Crystalline Copper and Quartz, from Wellington Mines.
 Samples 1, 2 and 3 Washing of Crushed Copper Quartz, Bruce Mines.
 Nine specimens of Copper Ore and Quartz, Bruce Mines.
 Eight specimens of Copper Ore from the Bruce Mines.
 Forty-one specimens of Fossils, from Manitouwaning, Manitoulin Island.
 Two specimens of Iron Ore, from Lake Superior Mines.
 One specimen of Silver from same place.
 One specimen Conglomerate Rock, from Sault St. Marie.
 One specimen Grey Copper, from Wellington Mines, near the Bruce, Lake Huron.
 Four specimens of Native Copper, from Mines on Lake Superior.
 One specimen of Dry Crushed Copper, from Bruce Mines.
 Nineteen specimens of Crystalline Copper Quartz, from the Bruce Mines.

FROM DR. GIBB, LONDON.

Concretions from Buckinghamshire, England.
 Six Bottles with specimens of Reptiles from the Valley of Inkerman, Crimea, viz. :
 Nineteen Snakes, various; three Lizards, various; three Millepedes; three Centi-
 pedes.

Also a specimen of a Pipe Fish, and of a Centipede Cricket.

The subjoined list contains the titles of the various Papers read at the ordinary Meetings of the Session, 1856-57 :

COMMUNICATIONS.

Capt. Kennedy.—“On the Proposed Expedition to the Arctic regions in further search of the records or remains of Sir John Franklin.” 6th December, 1856.

Rev. W. A. Adamson, D.C.L.—“On the Decrease, Restoration and Preservation of the Salmon in Canada.” 6th December, 1856.

Prof. Chapman.—“On some Trilobites found at Whitby, Canada West.” 13th December, 1856.

James Gilbert, Esq.—“On the Arizona Copper Mines.” 13th December, 1856.

Prof. Croft, D.C.L.—“Note on the Oxalate of Manganese.” 20th Dec., 1856.

Joseph Robison, Esq.—“On preserving Timber from decay.” 20th Dec., 1856.

The Hon. the Chief Justice Draper, C.B.—“Annual Address.” 10th Jan., 1857.

Prof. Bovell, M.D.—“On Cell Development.” 10th January, 1857.

Rev. Prof. Hincks.—“On Cell Development, in reply to the Paper read by Professor Bovell at the previous meeting.” 17th January, 1857.

Col. Baron de Rottenburg, C.B.—“On the General Telescopic aspect of the Five Primary Planets, including the Planet Mercury.” 17th January, 1857.

John Langton, M.A.—“On a small Capillary Wave hitherto undescribed.” 17th January, 1857.

Prof. Wilson, LL.D.—“On the Mediæval Pageant of the Dance of Death.” 17th January, 1857.

Prof. Kingston, M.A.—“On some Practical Applications of the Electric Telegraph.” 24th January, 1857.

Prof. Chapman.—“On some Crystals of Carbonate of Lime, from South Africa.” 24th January, 1857.

Prof. Wilson, LL.D.—“Traces of the early use of Pipes and Tobacco among different races.” 31st January, 1857.

Prof. Wilson, LL.D.—“On the customs, usages, and superstitions of the Old and New Worlds, in relation to Tobacco and other Narcotics.” 7th February, 1857.

Rev. Prof. Hincks.—“Notes on the Strigidæ found in the neighbourhood of Toronto.” 7th February, 1857.

John Langton, M.A.—“On the early French discoveries in North America.” 14th February, 1857.

Prof. Chapman.—“Remarks on the classification and leading characteristics of Palæozoic Corals.” 14th February, 1857.

Patrick Freeland, Esq.—“On a new traversing stage for the Microscope.” 21st February, 1857.

Prof. Kingston, M.A.—“Report on the Meteorological Observations made during the year 1856.” 21st February, 1857.

W. G. Tomkins, C.E.—“On the Preservation of Timber.” 21st February, 1857.

T. S. Stratford, M.D., New Zealand.—“Notes on the Natural History of New Zealand.” 28th February, 1857.

Rev. Prof. Young, M.A.—“On Sir David Brewster’s (Supposed) Law of Visible Direction in Monocular Vision, and the Corresponding Law of Visible Direction in Binocular Vision.” 7th March, 1857.

Col. Baron de Rottenburg, C.B.—“Proposition from Lieut. Ashe, R.N., to establish an Astronomical Observatory at Quebec.” 7th March, 1857.

J. H. Morris, M.A.—“Notes of Travel in China.” Part I. 14th March, 1857.

Col. Baron de Rottenburg, C.B.—“Report of Committee on Prof. Kingston’s Paper on the use of the Electric Telegraph in giving Notice of Storms.” 14th March, 1857.

Col. Baron de Rottenburg, C.B.—“Extracts from a letter of Mr. Chalmers of Barrie, F.R.A.S., detailing some observations made on a Supposed Volcano in the Moon, on the 26th February, 1857.” 14th March, 1857.

J. H. Morris, M.A.—“Notes of Travel in China.” Part II. 21st March, 1857.

Prof. Wilson, I.L.D.—“On Certain Homogeneous Characteristics ascribed to the Aboriginal Tribes of this Continent.” 21st March, 1857.

John McNaughton, Esq.—“Remarks on the Relations of Canada to the adjacent Territories.” 21st March, 1857.

Rev. A. C. Geikie.—“On Canadian English.” 28th March, 1857.

Col. Baron de Rottenburg, C.B.—“On the Planetary Appearance of Stars of the 1st and 2nd Magnitudes, on the night of the 12th March, and the occultation of Spica Virginis by the Moon on the morning of the 13th.” 4th April, 1857.

G. D. Gibb, M.D.—“On Supposed Fossils found in Buckingham, England.” 4th April, 1857.

Prof. Cherriman, M.A.—“On Vision.” 18th April, 1857.

J. Hirschfelder, Esq.—“Observations on Bedding out Plants.” 18th April, 1857.

Prof. Chapman.—“On the occurrence of the genus *Cryptoceras* in Silurian Rocks.” 18th April, 1857.

It is believed that the papers enumerated in the above list will compare favorably with those of other years: more especially, as several have been deemed worthy of republication in some of the leading Scientific Journals of Europe. It is also gratifying to observe, with regard to these papers, that the appeal of preceding Councils for more active co-operation on the part of Members generally, has been to a great extent responded to. The present Council venture, therefore, to express a hope that a still more extended co-operation in this department, may be anticipated in the session now about to commence.

Feeling strongly that the success of the Institute is dependent on, or at least largely influenced by, the success of its Journal, the Council have great satisfaction in alluding to the now fairly established and very marked success which has accompanied the issue of the new series of the “Canadian Journal,” under the editorship of Dr. Wilson and a Committee appointed by the respective Councils of 1855 and 1856. The Council cannot allow this opportunity to pass without expressing an earnest desire that some special recognition on the part of the Members of the Institute, be devised to mark their sense of the *zealous and valuable services* of the chief editor. The following is the Report of the Editing Committee, to which the Council beg to direct especial attention:

REPORT OF THE EDITING COMMITTEE.

With the close of the second volume of the Canadian Journal (N. S.) the Editing Committee beg to report to the Council, that they have continued during the past year to carry out the instructions originally drawn up for their guidance, with such partial modifications as experience has suggested. The success of the Journal has been such as they believe fully to confirm the opinion in which the New Series originated, that the time had *aricome* for the maintenance in Canada of a periodical specially devoted to original communications in Science and Literature.

From a desire to render the Journal more attractive, in some respects, to the general reader, the sum of £43 5s. has been expended during the past year on illustrations but as, in its new form, it is regarded as still in some respects an experiment, this increased outlay has been counterbalanced in part by economizing the accompanying letter-press. Still further, by the exercise of a careful oversight in the preparation of M.SS. for the press, along with the exertions of those Editors of Sections, who have mainly contributed the materials for the second

volume now completed, and have continued their gratuitous services for the revision and correction of the press: the Committee have much satisfaction in reporting that the cost of the journal is very little in advance of the reduced expenditure of £257 stated in their former report. From the Treasurer's accounts it appears that the entire outlay incurred in issuing the Canadian Journal for 1857, including printing, illustrations, and the expenses of postage consequent on its distribution throughout the Province, and to foreign societies, &c., amounts to £263 0s. 5d.

In carrying out the resolution of the Council relative to the gratuitous distribution of the Journal among such societies and other learned bodies as it may appear desirable to maintain correspondence with, copies are now regularly sent to those specified in the following list, some of whom already transmit their printed proceedings and other publications of much greater value, in exchange. The Committee have to record their grateful acknowledgements to the Smithsonian Institution at Washington, for facilities afforded to them in the transmission of sets of the Journal to various European Societies and Institutions.

Imperial Library of France.
 Geological Society of France.
 Society of Antiquaries of France.
 Royal Library of Copenhagen.
 Society of Antiquaries of the North, Copenhagen.
 Royal Library of Stockholm.
 Library of the University of Christiania.
 Smithsonian Institution, Washington.
 Academy of Sciences, Philadelphia.
 Historical Society of Philadelphia.
 Franklin Institute, Philadelphia.
 Natural History Society, Boston.
 Lyceum of Natural History, New York.
 Academy of Sciences, New Orleans.
 Observatory, Cambridge, Massachusetts.
 University Library, Michigan.
 Royal Society of London.
 Royal Society of Literature, London.
 Royal Society of Arts, "
 Royal Geographical Society, "
 Royal Geological Society, "
 Royal Astronomical Society, "
 Society of Antiquaries of London.
 Institute of British Architects.
 Institute of Civil Engineers.
 Archaeological Institute.
 British Archaeological Association.
 Ethnological Society of London.
 Microscopical Society of London.
 Chemical Society of London.
 Royal Society of Edinburgh.
 Royal Society of Arts, Edinburgh.

Royal Physical Society, Edinburgh.
 Society of Antiquaries of Scotland.
 Philosophical Society of Cambridge.
 Society of Antiquaries of Newcastle-on-Tyno.
 Royal Irish Academy.
 Library of Trinity College, Dublin.
 Natural History Society of Dublin.
 Geological Society of Dublin.

In the second volume of the Canadian Journal, for 1857, twenty-three original papers have been printed, twenty of which have been selected from those read at the meetings of the Institute during the Session of 1856-57. The abstracts of proceedings at the weekly meetings during the Session have also been continued; and thus the Journal is made practically to embody *the Transactions of the Canadian Institute*. In addition to these, the department of literary and scientific reviews has been uninterruptedly maintained; and the Committee have great pleasure in recording their acknowledgements of valuable services rendered by Professor Kingston, the Rev. Professor Young, and the Rev. Professor Hincks.

The section entitled SCIENTIFIC AND LITERARY NOTES continues to be maintained as a useful appendix for the dissemination of materials derived from Foreign Journals and other published sources, as well as for original notes, abstracts, and reports of the proceedings of other Societies. In this department, however, the Editing Committee would again earnestly urge on the members at large, the desirableness of their contributing the results of observations on subjects embraced in the various Sections. To several of these no single contribution has been offered during the past year; and in reference to that of Natural History especially, the Committee deeply regret that members residing throughout the Province should withhold reports of many observations and phenomena which must necessarily come under their notice, and could not fail to be of general interest.

Neither long nor elaborate communications are desired for this department; but brief notes, including reports of any remarkable astronomical or meteorological phenomena; notices of the appearance and disappearance of the migratory birds of our Northern latitudes; of the insects peculiar to different localities; and in general, of all that is novel or unrecorded relating to our Canadian fauna and flora. It is also highly desirable that reports of the discovery and contents of Indian graves, with descriptions of such ancient relics and works of art as are brought to light, should be put on record. The section of geology and mineralogy is another to which country members ought to be able to contribute notes which would possess an interest to many, and might in some cases lead to the discovery of new and important truths of great practical value. The Committee would only further add on this subject, that where members may be disinclined to communicate notes on the above, or other subjects, they may further the objects in view by transmitting specimens of Natural History, Minerals, Indian relics, &c., to the Editors for the purpose of being noticed in the Journal. All objects so transmitted will be carefully preserved and returned.

In reference to the original papers which occupy the larger portion of the Journal, the Committee are earnestly desirous of securing for this department such contributions as shall reflect credit on the Province, now that the plan of circulating the Journal among foreign Societies, is being successfully carried out; and they

trust that the success which has already rewarded their exertions—though far short of what they aim at,—may be regarded as sufficient to justify the hope of the *Canadian Journal* becoming a means of union and combined action among the Scientific and Literary Men of Canada, and a direct medium for the communication of such observations and discoveries to the scientific world, as have heretofore been published through the medium of English Societies' Transactions, or in foreign Scientific Journals.

In concluding this second report, the Editing Committee trust that it is unnecessary they should remind the Council, and the Members of the Society generally, that while they undertake the editing of the *Journal*, the contribution of materials for its pages is not only invited from the members at large, but is indispensable for its permanent success. The editorial oversight—including as it does, press reading, correspondence, and the preparation of those portions of each number which necessarily constitute editorial work,—is in itself sufficient to involve a considerable sacrifice of time to those on whom it chiefly devolves. But in addition to this the supply of the requisite matter for each successive number has heretofore been the work of so small a minority of those who ought to constitute the working members of the Institute,—a body now numbering upwards of six hundred members throughout the Province,—as to encroach to an unfair extent on services voluntarily and freely rendered on behalf of the Society at large.

Toronto, 3rd December, 1857.

DAN. WILSON, Convener.

With a view to add to the efficiency of the working staff of the Institute, the Council wish to recommend the adoption of the following changes relative to the election of Vice-presidents. They have come to the conclusion, after mature deliberation, that it is expedient to retain the services of the Vice-presidents for a longer time than that of a single year. Hence they propose that the first Vice-president shall retire annually, and his place be occupied by the second Vice-president; the third Vice-president becoming second; and that the new Vice-president who shall be elected to fill the vacancy shall rise successively to the rank of second and first Vice-president in subsequent years, before retiring from office. In this manner, it is thought, that a more thorough knowledge of the duties of the office and a greater interest in efficiently carrying out the same, will be acquired, than can reasonably be expected when, as at present, the tenure of office is limited to a single year. These proposed changes will be submitted to the Institute in proper form, for approval or rejection as the Members may think fit.

The financial prospects of the Institute are, on the whole, satisfactory. By the subjoined Report of the Treasurer, it will be seen that the estimated balance, after transferring a sum of £200 to the Building Fund, amounts to £343 3s. 7d.

TREASURER'S REPORT, 1857.

Dr.] *Statement of Canadian Institute General Account for 1857.*

Estimated balance from last year.....	£211	6	6
Cash received from Members.....	336	12	9
“ “ for sales of <i>Journal</i>	67	1	3
“ “ Parliamentary Grant.....	250	0	0

Cash received from Athenæum	£200	0	0
Arrears due the Institute by Members.....	316	1	3
“ “ for sales of Journal.....	84	6	3
Cr.]			£1465 8 0
Cash paid on account to publication of the Journal			
for 1856.....	111	13	10
“ “ “ for 1857.....	210	3	5
“ “ “ Library	98	0	5
“ “ “ Sundries	234	19	10
“ transferred to Building Fund.....	200	0	0
“ due on account of Journal.....	52	17	0
“ “ “ Library.....	29	14	7
“ “ “ sundries	34	15	4
Estimated deficiency in collecting subscriptions from Members, and for sale of Journal	150	0	0
Estimated Balance in favour of Institute.....	343	3	7
			£1465 8 0

Statement of Building Fund.

Balance from last year.....	£1269	5	9
Cash transferred from General Account	200	0	0
“ received for Interest on Investments.....	99	4	1
“ due “ “ “	79	12	10
“ “ on Subscription List (Building Fund)..	534	15	0
			£2182 17 8

Dr.] *The Treasurer in account with the Canadian Institute.*

Cash Balance from last year... ..	£	91	5	7
“ “ invested “	1389	6	8	
“ received for Interest on Investments.....	99	4	1	
“ “ from Athenæum.....	200	0	0	
“ “ Parliamentary Grant.....	250	0	0	
“ “ Members.....	336	12	9	
“ “ for sales of Journal.....	67	1	3	
			£2433 10 4	
Cr.]				
Cash paid on account to the publication of Journal				
for 1856	£111	13	10	
“ “ “ for 1857	210	3	5	
“ “ “ Library ..	98	0	5	
“ “ “ sundries.....	234	19	10	
“ “ “ invested	1600	0	0	
Balance in Bank of Upper Canada	178	12	10	
			£2433 10 4	

December 1, 1857.

D. CRAWFORD, *Treasurer.*

AUDITORS' REPORT, 1857.

The undersigned Auditors have to report that they have examined the Vouchers with the Cash-book and find them correct. Balance in the hands of the Treasurer One hundred and seventy-eight pounds twelve shillings and ten pence, and the sum of One thousand six hundred pounds invested on securities shewn to us.

T. W. BIRCHALL, }
SAMUEL SPREULL, } *Auditors.*

REPORT OF THE BUILDING COMMITTEE.

The Committee appointed to take steps for the erection of suitable buildings for the Canadian Institute, beg leave to report: That they have examined the working plans prepared by Messrs. Cumberland & Storm, in accordance with the resolution of the former Building Committee. Although highly approving of the general design and convenient arrangements of the contemplated buildings, they believe that the plans provide greater accommodation than will probably be required for several years, and that the cost of the erection would very much exceed the means at the disposal of the Institute. They endeavoured, therefore, to ascertain how far, without abandoning the hope of ultimately completing the whole, some portions of the design might for the present be altogether postponed, or only partially finished. They found, however, that even upon this supposition they could not hope to obtain a building which the Institute could occupy, under an outlay of £6,000, and that, even then, it would be in an unfinished state, and in many respects inconvenient in its arrangement, whilst the necessary alterations would very much increase the cost of completing the original design, if this should afterwards be found practicable.

The Committee have therefore been reluctantly compelled to abandon altogether the plan sanctioned by the former Building Committee, and to obtain a new design which, without exceeding the available means of the Institute, would afford liberal accommodation for present requirements, and be complete in itself whilst making provision for a possible extension hereafter.

Messrs. Cumberland & Storm had originally volunteered to prepare the plans and superintend the building gratuitously, but as the first design was entirely laid aside, the Committee, although fully appreciating the generosity of their offer, resolved that it would be more just to the architects, and would afford the Building Committee more complete control over the works, if Messrs. Cumberland & Storm were to be paid at the usual rate for their professional services connected with the new building.

Plans have therefore been prepared upon this understanding, and tenders have been advertised for, with the intention of submitting the plans and tenders at the same time to the Council for their sanction; but in the present financial difficulties it has been judged more prudent to postpone any action in the matter for another season.

JOHN LANGTON, Convener.

December, 1857.

In concluding this Report, the Council sincerely regret that the hope expressed at the close of the Report of last year with regard to the New Building, should be still unrealized. The delay in the prosecution of the work has not arisen from any supineness on the part of the Council; for, as will be seen by the above Report,

the Building Committee was re-organized during the past year, revised plans have been prepared, and much consideration has been bestowed upon the subject, both by the Committee and the Council. When, however, the requisite preliminaries had been so far matured as to encourage the anticipation of the work being immediately proceeded with, the expectations of the Council were once more disappointed, from difficulties connected with the financial aspect of the question, and the hopelessness of obtaining much additional assistance during a period of such uncertainty and commercial depression as that which now prevails. The Council trust, therefore, that in keeping the Institute free from embarrassment, by postponing the work until another season, it will be conceded to them, that here, as in other cases during their term of office, they have acted for the best interests of the trust confided to their charge.

E. J. CHAPMAN,

Vice-President.

Toronto, 5th December, 1857.

The Report was unanimously adopted.

Prof. Hind, M.A., gave notice of motion,—Saturday, 9th January, 1858,—for an alteration of the Law having reference to the mode of holding the election of office-bearers.

The following resolution was moved by F. W. Cumberland, Esq., and seconded by G. P. Ure, Esq., and unanimously carried :

“That in compliance with the recommendation of the Council, and in cordial recognition of the valuable and zealous services rendered by Dr. Wilson, as chief editor of the ‘Canadian Journal,’ the sum of £120 be placed at the disposal of the Council for presentation to him, in such manner as, whilst expressive of the gratitude of the Institute, may be most acceptable to himself.”

II. A ballot having been taken for officers of the Institute for the ensuing year,

The following Gentlemen were declared duly elected, viz. :

President, the Hon. Chief Justice	DRAPER, C.B.
1st Vice-President,	Col. BARON DE ROTTENBURG, C.B.
2nd Vice-President .	JOHN LANGTON, M.A.
3rd Vice-President,	Hon. W. B. ROBINSON.
Treasurer,	D. CRAWFORD, Esq.
Recording Secretary,	THOS. HENNING, Esq.
Corresponding do.	E. A. MEREDITH, LL.D.
Librarian,	Prof. H. CROFT, D.C.L.
Curator,	Prof. H. Y. HIND, M.A.
Council,	Prof. D. WILSON, LL.D.
do	Prof. E. J. CHAPMAN.
do	Rev. Prof. W. HINCKS, F.L.S.
do	Prof. J. B. CHERRIMAN, M.A.
do	SANDFORD FLEMING, Esq., C.E.
do	J. GEORGE HODGINS, M.A.

The following resolution was moved by F. W. Cumberland, Esq., seconded by R. Spratt, Esq., and unanimously carried :

“That the most cordial thanks of the Institute be tendered to the Officers and Editing Committee of the past year, to whose efficient and zealous services is to be attributed the continued success of the Institute.

III. By order of the Council, the Royal Charter of the Institute was produced, and ordered to be printed in the proceedings of the meeting, for the information of the members at large :

ROYAL CHARTER OF INCORPORATION OF "THE CANADIAN INSTITUTE," GRANTED 4TH NOVEMBER, 1851.

PROVINCE OF CANADA.—ELGIN AND KINCARDINE.

VICTORIA by the Grace of God of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith, &c. &c.

To all whom these presents shall come, greeting :

Whereas William E. Logan, John O. Browne, Frederick F. Passmore, Kivas Tully, William Thomas, Thomas Ridout, Sandford Fleming, and others of our loving subjects in our Province of Canada, have formed themselves into a Society for the encouragement and general advancement of the Physical Sciences, the Arts and the Manufactures, in this part of our Dominions; and more particularly for promoting the acquisition of those branches of Knowledge which are connected with the Professions of Surveying, Engineering, and Architecture: being the Arts of opening up the Wilderness and preparing the country for the pursuits of the Agriculturist, of adjusting with accuracy the boundaries of Properties, of improving and adorning our Cities and the habitations of our subjects, and otherwise smoothing the path of Civilization; and also being the Arts of directing the great sources of Power in Nature for the use and convenience of man, as the means of production and of traffic both for external and internal trade, and materially advancing the development of the Resources and of the Industrial Productions and Commerce of the Country; and have commenced the formation of a Museum for collections of Models and Drawings of Machines and Constructions, New Inventions and Improvements, Geological and Mineralogical Specimens, and whatever may be calculated, either as Natural Productions or Specimens of Art, to promote the purposes of Science and the general interests of society, and have subscribed and collected certain sums of money for these purposes.

And whereas, in order to secure the property of the said Society and to extend its useful operations and at the same time to give it a more permanent establishment among the Literary and Scientific Institutions of this part of our Dominions, we have been besought to grant to the said William E. Logan, John O. Browne, Frederick F. Passmore, Kivas Tully, William Thomas, Thomas Ridout, Sandford Fleming, and to those who now are or shall hereafter become members of the said Society, our Royal Charter of Incorporation, for the purpose aforesaid.

Now know ye that we, being desirous of encouraging a design so laudable and salutary, of our especial grace, certain knowledge, and mere motion, have willed, granted and declared, and do by these presents for us, our heirs and successors, will, grant and declare that the said William E. Logan, John O. Browne, Frederick Passmore, Kivas Tully, William Thomas, Thomas Ridout, Sandford Fleming, and such others of our loving subjects as now are members of the said Society, or shall at any time hereafter become members thereof according to such regulations or by-laws as shall be hereafter framed or enacted, shall by virtue of these presents be the members of, and form one body politic and corporate for the purposes aforesaid, by the name of "The Canadian Institute," by which name they shall have perpetual succession and a common seal, with full power and authority to alter,

vary, break, and renew the same at their discretion, and by the same name to sue and be sued, implead and be impleaded, answer and be answered unto, in every court, of us, our heirs and successors, and be forever capable in the law to purchase, receive, possess, and enjoy to them and their successors, any goods and chattels whatsoever, and also to be able and capable in law (notwithstanding the Statutes of Mortmain) to take, purchase, possess, hold and enjoy, to them and their successors, a Hall or House, and any Messuages, Lands, Tenements, or Hereditaments whatsoever, the yearly value of which, including the site of the said Hall, shall not exceed in the whole the sum of Two thousand pounds, computing the same respectively at the rack rent which might have been had or gotten for the same respectively at the time of the purchase or acquisition thereof, and to act in all the concerns of the said body politic and corporate for the purposes aforesaid as fully and effectually, to all intents, effects, constructions, and purposes whatsoever, as any other of our liege subjects or any other body politic or corporate in our said Province of Canada, not being under any disability, might do in their respective concerns.

And we do hereby grant our especial license and authority unto all and every person and persons, bodies politic and corporate, otherwise competent, to grant, sell, alien, and convey in Mortmain unto and to the use of the said Society and their successors any Messuages, Lands, Tenements, or Hereditaments not exceeding such annual value as aforesaid. And our will and pleasure is, and we further grant and declare, that there shall be a General Meeting of the Members of the said body politic and corporate, to be held from time to time as hereinafter mentioned, and that there shall always be a Council to direct and manage the concerns of the said body politic and corporate, and that the general meetings of the council shall have the entire direction and management of the same in the manner and subject to the regulations hereinafter mentioned. But our will and pleasure is, that at all General Meetings and Meetings of the Council, the majority of the members present, and having a right to vote thereat respectively, shall decide upon the matters propounded at such meetings, the person presiding therein having, in case of an equality of numbers, a second or casting vote.

And we do hereby also will, grant, and declare that the Council shall consist of a President, not more than three nor less than one Vice-President, and not more than eleven nor less than three other Members, to be elected out of the members of the said body politic and corporate, and that the first Members of the Council, exclusive of the President, shall be elected within six calendar months after the date of this our Charter, and that the said William E. Logan shall be the first President of the said body politic and corporate.

And we do hereby further will, grant and declare that it shall be lawful for the members of the said body politic and corporate hereby established to hold General Meetings once in the year or oftener, for the purposes hereinafter mentioned—viz, that the General Meeting shall choose the President, Vice Presidents, and other Members of the Council; that General Meetings shall make and establish such by-laws as they shall deem to be useful and necessary for the regulation of the said body politic and corporate, for the admission of members, the establishment of Branch Societies, the management of the estate, goods, and business of the said body politic and corporate, and for fixing and determining the manner of

electing the President, Vice-President, and other Members of the Council, and the period of their continuance in office, as also of electing and appointing a Treasurer, two Auditors, and two Secretaries, and such other officers, attendants, and servants, as shall be deemed necessary or useful for the said body politic and corporate, and such by-laws from time to time shall or may alter, vary or revoke, and shall and may make such new and other by-laws as they shall think most useful and expedient, so that the same be not repugnant to the laws of England, to these presents, or to the laws and statutes of this our Province of Canada, and shall and may also enter into any resolution and make any regulation respecting any of the affairs and concerns of the said body politic and corporate as shall be thought necessary and proper.

And we further will, grant and declare that the Council shall have the sole management of the income and funds of the said body politic and corporate, and also the entire management and superintendance of all the other affairs and concerns thereof, and shall and may—but not inconsistently with or contrary to the provisions of this our Charter or any existing by-law, the laws of England, or the laws and statutes of our said Province of Canada—do all such acts and deeds as shall appear to them necessary or essential to be done for the purpose of carrying into effect the objects and views of the said body politic and corporate.

And we further will, grant and declare that the whole property of the said body politic and corporate shall be vested, and we do hereby vest the same, solely and absolutely in the members thereof, and that they shall have full power and authority to sell, alienate, charge or otherwise dispose of the same as they shall think proper; but that no sale, mortgage, incumbrance, or other disposition of any Messuages, Lands, Tenements, or Hereditaments belonging to the said body politic and corporate shall be made, except with the approbation and concurrence of a General Meeting.

And we lastly declare it to be our royal will and pleasure that no resolution or by-law shall on any account or pretence whatsoever be made by the said body politic and corporate in opposition to the general scope, true intent and meaning of this our Charter, the laws of England, or the laws and statutes of this our said Province of Canada, and that if any such rule or by-law shall be made, the same shall be absolutely null and void to all intents, effects, constructions and purposes whatsoever.

In testimony whereof we have caused these our Letters to be made Patent, and the Great Seal of our said Province to be hereunto affixed.

Witness our Right Trusty and Right Well-beloved Cousin James, Earl of Elgin and Kincardine, Knight of the Most Ancient and Most Noble Order of the Thistle, Governor General of British North America, and Captain General and Governor-in-Chief in and over our Provinces of Canada, Nova Scotia, New Brunswick, and the Island of Prince Edward, and Vice Admiral of the same, &c. &c., at Quebec, this fourth day of November, in the year of Our Lord One Thousand Eight Hundred and Fifty one, and in the fifteenth year of our reign.

W. B. RICHARDS,
Attorney General.

By Command,
E. A. MEREDITH,
Assistant Secretary.

IV. *The following Papers were read:*

1. By Professor Cherriman, M.A. :
"Note on the propositions of Pythagoras and Pappus."
2. By Professor Kingston, M.A. :
"On deducing the mean temperature of a month from the daily indications of self-registering Thermometers."

THIRD ORDINARY MEETING.—9th January, 1858.

The Hon. Chief Justice DRAPER, C.B., President, in the Chair.

I. *The following Gentlemen were elected Members :*

- W. H. GRIFFIN, Esq., Toronto.
 T. BRIGHTON, Esq., Toronto.
 JAMES AUSTIN DICKINSON, Esq., Toronto.
 W. RADENHURST, Esq., Toronto (Junior Member.)

II. Dr. Wilson acknowledged the receipt of a service of silver Plate from the members of the Institute, presented to him in accordance with the unanimous resolution of the last General Meeting, and returned thanks for the same.

III. *The following donations to the Library and Museum were announced, and the thanks of the Institute voted to the donors :*

1. From the Hon. East India Company :
Bombay Magnetical and Meteorological Observations. 1854 and 1855.
2. From the Chief Superintendent of Education, Upper Canada :
Annual Report of the Normal and Common Schools in Upper Canada for 1856.
3. From the Hon. J. M. Brodhead, Washington :
Patent Office Reports, 1856.
Mechanics. Vols. I. II and III.
Agriculture. Vol. I.
Report of the Commercial relations of the United States with all Foreign Nations. Vol. IV.
4. From J. F. Smith, Esq. :
A specimen of the Atlantic Telegraph Cable.

IV. The ANNUAL ADDRESS was delivered by the President, the Hon. Chief Justice Draper, C.B.

The following resolution was moved by the Rev. Dr. McCaul, seconded by Col Baron de Rottenburg, C.B., and carried by acclamation :

"That the special thanks of the Institute be given to the President for his able Address, and that a copy be requested for publication in the Journal."

V. *The following Papers were read:*

1. By Professor Croft, D.C.L. :
"On the oxidation of Arsenious Acid."
2. By F. Assickinack, Esq. :
"On the Legends and Traditions of the Odahwah Indians."
3. By Professor Kingston, M.A. :
"Report of the Meteorological Committee of the Council."

FOURTH ORDINARY MEETING—16th January, 1858.

The Hon. Chief Justice DRAPER, C.B., President, in the Chair.

I. *The following Gentlemen were elected Members :*

WILLIAM ANNIS, Esq., Toronto.

HENRY J. CAMBIE, Esq., M.A., Toronto.

II. *The following donations for the Museum were announced, and the thanks of the Institute voted to the donor :*

By J. F. Smith, Esq. :

Eighteen specimens of Shells and Fossils from the Chalk of Kent and Sussex, England.

III. Prof. Hind's notice of motion respecting the proposed alteration in the laws was taken up, when, in the absence of Prof. Hind, Prof. Wilson moved, seconded by A. E. Meredith, LL.D. : that in Rule 4th, Section IV, the following be substituted for the last clause, beginning "votes of country members," &c. "A printed list of members nominated for election as office-bearers, shall be forwarded by Post to country members, but no list shall be received by the Scrutineers, unless presented personally by the member desiring to vote."

After discussion of the question, Dr. Wilson withdrew his motion, in favor of the following motion, by E. W. Cumberland, Esq., seconded by P. Freeland, Esq., which was adopted :

"That the Constitution and Laws, so far as they refer to nomination and election of officers, be remitted to the Council for report of such alterations as they may deem expedient.

IV. *The following Papers were read :*

1. By Professor Chapman :

"On the assaying of Coals by the blow-pipe, with remarks on blow-pipe examinations in general."

2. By the Rev. Professor Hincks, F.L.S. :

"Notes respecting a collection of Mazatlan Shells recently acquired by the University of Toronto."

FIFTH ORDINARY MEETING—23rd January, 1858.

The Hon. Chief Justice DRAPER, C.B., President, in the Chair.

I. *The following Gentlemen were elected members :*

Major R. LACHLAN, Cincinnati, Ohio, Cor. member.

EDWARD C. JONES, Esq., Toronto.

A. B. SCOTT, Esq., Toronto.

MATHEW LOGAN, Esq., Toronto.

WALTER BEATY, Esq., Toronto.

Rev. J. G. ALRAHALL, M.A., Toronto.

CHARLES A. JONES, Esq., Weston.

A. CLIFFORD THOMPSON, Esq., Toronto. } Junior members.

II. *The following Papers were read :*

1. By Professor Wilson, LL.D. :

"Note on the American Cranial Type."

2. By Professor Kingston, M.A. :

"The Annual Meteorological Report."

3. By F. Assikinack, Esq. :

"On the manners and customs of the Odahwah Indians."

General Meteorological Register for the year 1857.
 MEAN METEOROLOGICAL RESULTS AT TORONTO FOR THE YEAR 1857.
 BY PROFESSOR KINGSTON, M.A., DIRECTOR OF THE PROVINCIAL MAGNETIC OBSERVATORY, TORONTO.

The mean temperature of the year 1857 was $42^{\circ}.73$, being $1^{\circ}.34$ below the average of 15 years, but $0^{\circ}.57$ above that of the preceding year. The mean temperatures of the several months were in seven instances below, and in five above the averages for the respective months, the average depression to the average elevation being moreover in the ratio of 4 to 2.5. January was the coldest, January and February was the warmest February on record, and the greatest deviation from their respective averages but in contrary directions, was so great as to occasion an inversion in the difference between their temperature; for whereas February is on the average $0^{\circ}.24$ colder than January it was in this instance by $5^{\circ}.78$ the warmer of the two.

Another example somewhat similar but not amounting to an inversion occurred at the close of the year. November, which, on the average is more than 9° warmer than December but $1^{\circ}.7$ warmer in 1857. January was further remarkable for exhibiting the lowest absolute temperature— 29° 1 that ever occurred in January, and February was also remarkable for the high temperature $52^{\circ}.4$ that ever occurred in February. The minimum of November— $3^{\circ}.5$ was more than 10° lower than any temperature that occurred before in that month. January was moreover not only the coldest January on record and the coldest month of 1857, but it was absolutely the coldest month ever recorded.

The highest absolute temperature was $86^{\circ}.6$ in August, and the lowest— 20° 1 in January.

There were 71 instances in which the temperature at the hour of observation was depressed 20° below the normal for that hour, 17 instances only when there was an equal deviation in excess.

BAROMETER.—The highest reading of the barometer was 30.361 inches, and the lowest ever recorded, occurred at 10° a. m. on 19th November. There were 43 instances in which the reading of the barometer exceeded the average, and 54 when it fell short of the average to the extent of half an inch. The greatest deviation in excess was 0.748 at midnight on 10th February, and the greatest deviation in defect was 1.110 at 8 a. m. 19th November.

The greatest barometric range within 24 hours with a rising column was $.918$ on 8th February, and the greatest with a falling column was $.719$ on 26th February.

HUMIDITY.—The mean humidity of the year was 79, the greatest monthly humidity being in January, and the least in April and May. There were 15 instances of complete saturation, of which 7 occurred in January, 4 in February, 2 in March, and 2 in December. The days of the greatest humidity were 22nd January and 5th February, on both of which the mean humidity of the day amounted to 98. The least humidity at the time of observation was 33 on the 4th March, and the two driest days were 30th March with a mean humidity of 54, and 21st May with a mean humidity 55.

CLOUDS.—The extent of sky clouded was on the average of the year three-fifths of the whole, and for nine months the sky was on the average more than half overcast. December was the most cloudy month, and September the month most free from clouds. The most cloudy hours on the average were from 2 to 4 p. m., and the hour most free from clouds was 10 p. m.

Provincial Magnetic Observatory, Toronto, C. W.
 Read before the Canadian Institute 23rd January, 1858.

WIND.—The resultant direction of the wind it will be seen from the table was rather more from the north than usual, and both the resultant velocity and the mean velocity were less than in the preceding year. The most windy day was 24th October when the velocity was 27.08 miles per hour. The most windy hour absolutely was 6 a. m. to 7 a. m. on 10th February, when the velocity was 44.6 miles per hour. The most windy hour on the average of the year was from noon to 1 p. m. with an average velocity of 10.63 miles per hour, and the least windy hour from 5 to 6 a. m. with an average velocity of 6.36 miles per hour.

RAIN AND SNOW.—The depth of rain, 33.295 inches, was considerably in excess of that of late years, but the total depth of rain and melted snow, though amounting to 40.555 inches fell short by about one inch of that of 1855, when the quantity of snow was extraordinarily great. August was the most rainy month, considered, with reference to the quantity of rain, and June with reference to the number of rainy days. January, both as regards the quantity of rain and the number of rainy days, was the least rainy month, but if snow be reckoned as well as rain January will rank next to August with respect to the amount, and next to June with respect to the number of days of precipitation. The most rainy day was 14th February, when the depth amounted to 1.620 inches, and the heaviest fall of snow was on 16th January with a depth of 5.5 inches.

Rain fell on 134 days and snow on 79 days, including some of the days already enumerated as days of rain; and there were but 171 days when neither rain or snow fell, a number of fair days, less by 27, than those of either of the three preceding years. The rain occupied 613.3 hours, and the snow 322.5 hours in its fall, giving a total of 935.8 hours or upwards of 33 days when rain or snow was actually falling. The hour when rain was most prevalent throughout the year was from 3 p. m. to 4 p. m., similarly the most snowy hour was from 5 p. m. to 6 p. m., and the hour most subject to rain or snow was from 2 p. m. to 3 p. m. The hours most free from rain and snow considered separately were from 5 a. m. to 6 a. m. for rain, and 1 a. m. to 2 a. m. for snow; and the hour most free from rain or snow collectively was from midnight to 1 a. m.

THUNDERSTORMS.—Of the 23 thunderstorms enumerated in the table there were but few remarkable for violence. There were besides 19 days when lightning occurred without thunder or hail, 3 days of thunder without lightning or hail, and 6 days when hail fell unaccompanied by either thunder or lightning.

AURORAS.—The nights favorable for observing auroras and the number of auroras observed were both considerably less than in the preceding three years, but the auroras that were observed on the nights of 7th May and 17th November were far more brilliant than any recorded during the same period. From the 10th to the 13th August the periodic auroras were numerous, and of considerable brilliancy; in November there was a remarkable absence of these bodies.

TORONTO IN WINTER.—Toronto Bay was clear of ice on the 17th April. During the severe weather in November it was frozen over, but on the return of the mild weather in December the ice again disappeared.

The following table exhibits the general Meteorological Register, for the year 1857, deduced from the observations taken at the Provincial Observatory, Toronto:

	Year 1853.	Year 1854.	Year 1855.	Year 1856.	Year 1857.	Decr.	Novr.	Octr.	Sept.	Augst.	July.	June.	May.	April.	March.	Feb'y.	Jan'y.
Mean Temperature.....	43.08	45.21	43.16	42.73	31.86	33.54	45.42	58.61	65.31	67.76	56.92	48.87	35.36	27.82	28.53	28.75	19.46
Difference from average (18y's.).....	-0.29	+0.87	-1.99	-1.84	+5.51	-3.08	+0.92	+0.57	-0.71	+0.73	-4.24	-2.44	-5.70	-7.19	-5.55	-10.47	0.85
Ther. Anomaly (Lat. 43° 40' N.).....	7.02	5.79	8.84	8.27	4.11	9.66	8.38	2.86	3.19	0.94	-7.68	-9.23	-14.84	-12.28	-6.17	-20.05	18.61
Highest Temperature.....	99.2	99.2	96.6	88.2	46.0	58.2	64.0	82.0	88.2	86.6	76.0	74.8	52.0	52.0	57.6	37.2	19.46
Lowest Temperature.....	25.4	10.8	18.7	20.1	4.7	3.5	26.5	34.1	46.0	47.0	35.0	26.0	5.9	5.5	5.0	0.2	0.85
Monthly and Annual Ranges.....	118.2	110.0	115.3	108.3	41.3	61.7	37.5	47.9	42.2	39.6	41.0	48.8	46.1	46.1	58.3	57.3	18.61
Mean Maximum Temperature.....	.....	.....	.....	.....	35.75	39.94	51.93	67.48	74.45	76.79	65.48	57.17	43.36	35.25	35.66	28.75	19.46
Mean Minimum Temperature.....	.....	.....	.....	.....	24.20	26.55	37.47	43.14	51.95	59.32	48.99	40.24	27.79	17.79	17.46	15.25	0.85
Mean Daily Range.....	.....	.....	.....	.....	11.55	13.39	14.45	17.34	22.50	17.47	16.49	16.94	16.21	17.46	17.46	22.50	18.61
Greatest Daily Range.....	.....	.....	.....	.....	29.8	27.0	26.2	28.5	28.0	24.4	24.4	26.8	26.8	37.0	37.0	32.0	35.0
Mean Height of Barometer.....	29.6294	29.6294	29.5899	29.5899	26.6188	26.5248	29.6671	29.7120	29.5943	29.5853	29.4267	29.5533	29.5300	29.5300	29.5300	29.7362	29.7362
Difference from average (12y's.).....	-0.0056	-0.0122	-0.0206	-0.0145	-0.2773	-0.9530	+0.0273	+0.0579	-0.0418	-0.0930	-0.1551	-0.1822	-0.1822	-0.1822	-0.6357	+0.1061	+0.1061
Highest Barometer.....	30.552	30.247	30.480	30.361	30.258	30.281	29.994	30.076	29.890	29.848	29.707	29.896	29.896	30.006	30.006	30.168	30.168
Lowest Barometer.....	28.655	28.459	29.452	28.452	28.852	28.452	29.289	29.248	29.155	29.255	28.952	29.199	28.898	28.898	29.115	29.181	29.181
Monthly and Annual Ranges.....	2.093	1.560	2.021	1.909	1.406	1.829	0.705	0.828	0.705	0.593	0.755	0.697	0.697	1.108	0.901	0.987	0.987
Mean Humidity.....	.77	.79	.75	.79	.80	.77	.78	.78	.77	.78	.77	.77	.74	.74	.77	.89	.89
Mean Elasticity of Aqueous Vapor.....	0.263	0.270	0.244	0.251	0.149	0.157	0.248	0.303	0.467	0.520	0.353	0.254	0.156	0.156	0.124	0.088	0.088
Mean of Cloudiness.....	0.60	0.59	0.57	0.60	0.73	0.67	0.62	0.43	0.47	0.46	0.60	0.61	0.61	0.51	0.72	0.68	0.68
Resultant Direction of Wind.....	N 74 W	N 43 W	N 71 W	N 74 W	N 89 W	N 61 W	N 19 W	N 68 W	N 77 W	S 68 E	N 49 W	N 23 W	N 63 W	N 60 W	N 63 W	N 70 W	N 70 W
" Velocity of Wind.....	2.51	2.51	3.03	2.51	2.51	5.45	2.93	1.61	1.51	0.81	1.15	1.15	1.15	4.15	6.63	4.96	4.96
" " (miles per h.).....	8.15	6.02	8.31	7.99	8.84	9.25	6.24	5.55	6.36	4.74	7.60	7.60	8.13	10.24	10.84	10.31	10.31
Difference from average (10 y's.).....	+2.33	+0.53	+2.19	+1.68	-0.80	+2.45	+0.74	+0.23	+1.36	+0.19	+2.87	+2.00	+3.01	+3.17	+3.01	+2.75	+2.75
Total Amount of Rain (inches).....	31.650	27.765	21.504	33.203	3.203	3.235	1.010	2.640	5.265	3.475	5.060	4.145	4.145	1.765	3.351	3.050	1.946
Difference from avg. (17-18y's.).....	+0.286	-3.571	-9.324	+2.233	+1.568	+0.291	-1.693	+2.438	+2.438	-0.897	+1.897	+1.016	+1.016	-0.783	-1.108	-1.501	-1.501
Number of Days with Rain.....	168	114	96	134	71	14	10	13	13	15	15	15	15	11	11	11	11
Total Amount of Snow (inches).....	49.5	49.5	65.5	73.8	9.0	6.9	0.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Difference from average (15y's.).....	+8.9	-6.1	+3.6	+11.1	-5.03	3.63	-0.86	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Number of Days Snow.....	61	52	60	79	11	9	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Number of Fair Days.....	198	199	198	171	12	9	19	19	18	16	9	10	15	15	15	14	14
Number of Auroras observed.....	46	52	35	26	2	2	2	6	2	1	1	3	1	3	2	0	0
Possible to see " (No. Nights).....	201	203	201	180	12	14	13	21	22	22	14	14	17	17	13	12	12
Number of Thunderstorms.....	38	58	25	28	0	1	0	2	6	7	7	7	2	2	1	0	0

Temperature—The mean temperature of December was 50°r above the average of 18 years. It was once equalled (in Dec., 1852), but never exceeded in that period.

Rain—The depth of rain was 1.568 inches above the average of 17 years.

Snow—The depth of snow was 5.03 inches less than the average of 15 years.

Wind—The mean velocity of the wind was 0.80 miles per hour less than the average of 10 years. The resultant Direction and Velocity, from 1848 to 1857 inclusive, were N 76° W. 2.86 miles per hour.

Comparatively, the month has been warm, rainy, cloudy, and calm.

COMPARATIVE TABLE FOR DECEMBER.

YEAR.	TEMPERATURE.				RAIN.		SNOW.		WIND.		
	Mean.	Difference from Average.	Maximum Observed.	Minimum Observed.	Range.	No. of days.	Inches.	No. of days.	Inches.	Resultant Direction.	Mean Velocity.
1840	24.3	-2.0	41.0	-4.4	45.4	3	6.609	18	...	...	1.331lbs
1841	28.7	2.4	45.5	+2.3	49.1	7	0.880	17	...	...	0.61 "
1842	24.7	+1.6	40.3	+3.0	36.5	8	1.040	8	6.1	...	0.53 "
1843	30.0	+3.7	41.1	+2.7	38.4	6	Imp.	6	4.2	...	0.40 "
1844	28.2	+1.9	48.9	-0.8	49.7	2	Imp.	12	4.7	...	0.70 "
1845	21.1	-5.2	37.6	+3.7	45.5	2	Imp.	9	6.0	...	0.57 "
1846	27.5	+1.2	43.2	+3.7	45.5	7	1.215	9	6.8	...	0.35 "
1847	30.1	+3.8	50.0	+6.6	43.4	7	1.185	8	6.8	S 83 W	5.44ms.
1848	29.1	+2.8	49.1	+0.6	46.5	7	2.750	7	16.5	N 82 W	2.56 6.23 "
1849	26.5	+0.2	41.3	-5.2	46.5	5	0.840	12	9.6	N 44 W	2.93 7.40 "
1850	21.7	-4.6	48.3	-9.7	58.0	2	0.100	18	10.7	S 82 W	4.00 7.37 "
1851	21.5	-4.8	43.8	-10.5	54.3	6	1.075	15	10.7	S 69 W	1.03 6.54 "
1852	31.0	+5.6	51.0	+13.9	37.1	7	3.995	10	20.1	N 38 W	2.41 4.99 "
1853	25.3	-1.0	42.2	-5.2	47.4	4	0.625	13	22.3	N 47 W	4.18 8.65 "
1854	21.9	-4.4	41.8	-5.9	47.7	5	0.500	12	17.2	S 88 W	5.29 11.88 "
1855	26.8	+0.5	45.9	-2.1	48.0	6	1.345	10	29.5	S 87 W	4.62 11.66 "
1856	22.9	-3.4	41.2	+5.1	50.3	6	1.790	20	16.3	N 89 W	2.51 6.84 "
1857	11.9	-6.6	45.6	+5.7	39.9	7	3.205	14	9.0	...	...
Mean	26.3	...	44.05	-0.90	45.55	5.2	1.637	11.9	14.03	...	7.64

Highest Barometer 30.258 at 11 a.m. on 12th } Monthly range =
 Lowest Barometer 28.852 at 6 a.m. on 31st } 1.406 inches.

Self-registering Thermometer
 Maximum temperature 46°0 on p. m. of 8th } Monthly range =
 Minimum temperature 4.7 on a. m. of 27th } 41°3

Mean maximum temperature 35°75 } Mean daily range = 11°55
 Mean minimum temperature 24°20 }
 Greatest daily range 29°8 from a. m. of 27th to a. m. of 28th.

Least daily range 3.5 from a. m. of 25th to a. m. of 26th.
 Warmest day 9th ... Mean Temperature 40°37 } Difference = 19°90.
 Coldest day 26th ... Mean Temperature 20°47 }

Maximum Solar Radiation { Solar 65°5 on p. m. of 8th } Monthly range =
 Terrestrial -2.5 on a. m. of 27th } 68°0

Aurora observed on 2 nights, viz.: 20th and 22nd; possible to see Aurora on 12 night; impossible on 10 nights.

Snowing on 14 days; depth, 9.0 inches; duration of fall 52.2 hours.
 Raining on 7 days; depth, 3.205 inches; duration of fall, 64.2 hours.

Mean of cloudiness = 0.73; most cloudy hour observed; 8 a. m., mean = 0.78; least cloudy hour observed, 10 p. m.; mean = 0.67.

Sums of the components of the Atmospheric Current, expressed in Miles.

North. 1183.67 South. 1158.16 East. 1103.82 West. 2986.64

Resultant direction of the wind, N 89° W; Resultant Velocity, 2.51 miles per hour.
 Mean velocity of the wind 6.84 miles per hour.

Maximum velocity 31.8 miles per hour, from 8 to 9 p. m. on 18th.
 Most windy day 18th—Mean velocity, 17.42 miles per hour.

Least windy day 16th—Mean velocity, 0.33
 Most windy hour, noon, to 1 p. m.—Mean velocity, 8.79 do } Difference
 Least windy hour, 5 to 6 p. m.—Mean velocity, 5.79 do } 3.00 miles.

- 6th—Very dense Fog at 9 p.m.
- 12th—Corona round Jupiter at 10 p.m.
- 16th—Dense Fog during the whole day.
- 17th—Dense Fog till 10 p.m.
- 22nd—Solar Halo, 9.45 p.m. Upper portion very distinct.
- 27th—Very perfect Lunar Halo at 7 p.m.
- 28th—Very perfect Lunar Halo from 10 p.m.
- 29th—Perfect Lunar Halo from 8.40 to 11 p.m.

MONTHLY METEOROLOGICAL REGISTER AT THE PROVINCIAL MAGNETICAL OBSERVATORY, TORONTO, CANADA WEST.—JANUARY, 1853.
 Latitude—43 deg. 39.4 min. North. Longitude—5h. 17m. 33s. West. Elevation above Lake Ontario, 108 feet.

Day	Barom. at temp. of 32°.			Temp. of the Air.			Mean Temp. of the Air.			Tons. of Vapour.			Humidity of Air.			Direction of Wind.			Result. Direc-tion.	Direction of Wind.			Re- sult.	in inches.	in inches.	Snow in inches.
	6 A.M.	10 P.M.	Mean.	6 A.M.	2 P.M.	10 P.M.	MEAN	Of the Average	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.		2 P.M.	10 P.M.	6 A.M.					2 P.M.	10 P.M.	MEAN
1	29.244	29.529	29.816	29.532	33.2	35.0	22.0	29.48	4.27	151	134	125	.80	.67	.86	.77	S b E	W b N	Calm.	N 81 W	0.0	4.40	5.47	...	...	0.1
2	.777	.635	.674	.6937	26.6	35.3	23.6	27.77	2.57	126	101	105	87	48	72	71	S W b S	S W b W	W	S 63 W	7.8	7.11	7.27	...	...	...
3	.605	.521	.563	.582	22.5	33.2	23.2	27.77	2.57	102	110	—	86	47	—	—	S W b S	S W b W	S W b W	S 54 W	5.1	19.0	13.96	...	...	...
4	.174	.105	.283	.1092	37.1	44.8	40.4	40.18	15.05	143	133	120	87	49	86	68	S W b S	S W	E b N	S 50 W	18.0	7.08	7.17	...	...	2.0
5	.456	.492	.507	.4933	32.8	34.8	25.9	29.97	4.83	163	133	120	87	49	86	78	W b N	S	E b N	N 52 E	6.0	5.75	4.77	...	...	1.0
6	.503	.447	.515	.5056	16.9	20.2	19.8	20.63	4.60	91	99	89	86	37	84	82	N E	N E b E	Calm.	N 38 W	2.2	2.23	4.77	...	...	...
7	.801	30.032	30.252	30.032	20.9	22.7	20.5	20.37	4.77	87	71	74	81	65	68	73	Calm.	S W b W	S b E	N 55 W	0.0	3.89	8.29	...	...	...
8	30.387	30.298	30.030	30.215	14.7	24.8	25.2	21.25	3.88	86	65	68	81	65	68	73	Calm.	S W b W	S b E	S 10 E	0.0	3.82	4.83	...	...	...
9	29.689	29.622	29.798	29.712	34.7	38.2	25.9	32.70	7.57	162	128	93	81	56	66	65	S W b S	W S W	W	S 63 W	14.2	7.13	7.67	...	...	...
10	.938	.889	.913	.916	5.3	33.2	—	—	—	84	132	—	91	70	—	—	Calm.	E	E b N	N 85 E	0.0	8.60	8.71	...	...	0.517
11	.219	28.973	.253	.1525	39.7	45.7	39.3	41.05	16.00	222	268	163	205	51	68	79	E b N	S W b S	W S W	S 69 W	4.8	11.3	15.87	...	...	0.030
12	.708	29.805	.866	.8250	35.0	33.7	33.9	33.77	8.63	116	108	155	129	57	56	79	N W	N b W	E S E	N 68 E	20.0	3.28	9.92	...	...	...
13	.642	.581	.652	.6688	34.2	40.2	31.9	35.82	10.73	177	197	108	148	89	79	70	E	W	W	S 81 W	13.8	5.49	9.12	...	...	...
14	.932	.925	.940	.9313	27.7	36.4	32.4	31.90	6.80	136	167	161	152	90	79	87	S	S	N E b E	S 83 E	0.0	3.78	5.83	...	...	...
15	.782	.641	.665	.5083	35.6	37.1	36.8	36.05	10.95	170	147	203	175	84	66	93	E b S	E	E b S	N 56 W	13.6	8.42	8.98	...	...	0.2
16	.156	.254	.404	.3192	36.4	35.7	26.3	32.32	7.32	200	160	138	160	76	96	86	S W b W	N W	N W	N 71 W	3.0	15.50	15.93	...	...	0.350
17	.671	.709	.700	.6778	27.7	32.4	28.8	28.98	4.02	139	165	129	138	91	89	81	W b N	N W	Calm.	N 68 W	12.8	3.65	4.24	...	...	0.2
18	.650	.638	.733	.6773	27.7	32.4	28.8	28.98	4.02	139	165	129	138	91	89	81	S b W	W S W	N W	N 68 W	1.6	2.75	3.86	...	...	0.2
19	.766	.722	.719	.7343	25.2	31.4	25.7	27.27	2.36	93	128	130	116	68	72	79	N b W	S E	W S W	S 16 E	3.5	1.86	2.31	...	...	0.3
20	.744	.807	.850	.8088	25.2	31.2	29.5	29.17	4.32	115	150	132	132	85	77	80	N W	S W	W S W	S 47 W	0.2	4.13	4.45	...	...	...
21	.812	.784	.834	.8593	25.9	40.7	33.9	33.90	9.12	180	128	143	86	70	66	74	S W b W	S W	Calm.	S 50 W	4.9	2.46	5.10	...	...	...
22	30.187	30.304	30.252	30.2503	24.9	40.7	33.9	33.90	9.12	180	128	143	86	70	66	74	S W b W	S W	Calm.	S 50 W	4.9	2.46	5.10	...	...	...
23	30.150	30.083	30.044	30.0013	20.5	33.0	16.7	21.30	3.47	115	98	67	91	87	78	81	N E	E b N	N E	N 66 E	9.7	15.0	10.87	...	...	...
24	30.049	29.954	29.984	29.748	27.4	38.4	31.4	27.97	3.28	117	154	143	126	85	82	80	Calm.	E b N	N E	N 57 E	6.8	2.68	2.77	...	...	0.125
25	29.905	29.787	29.608	29.748	38.2	43.3	43.4	41.80	17.22	212	272	246	246	92	97	93	Calm.	E b N	Calm.	N 76 E	0.0	1.22	1.22	...	...	0.075
26	.369	.335	.435	.3855	13.0	45.8	39.7	42.82	18.30	170	174	193	210	95	66	75	E S E	S W b W	W S W	S 63 W	6.0	9.75	10.77	...	...	0.015
27	.462	.480	.552	.5020	33.9	29.9	23.8	29.02	4.67	143	117	99	121	74	76	76	N b W	N W	N W	N 32 W	4.0	7.7	7.53	...	...	inap.
28	.487	.398	.484	.4552	19.1	25.9	25.9	23.55	0.75	81	120	109	82	85	89	84	N b W	N E b E	N b W	N 14 W	4.2	7.6	7.40	...	...	inap.
29	.504	.505	.577	.5313	25.2	25.8	23.4	24.57	0.37	110	100	95	101	81	71	75	W N	N W	N W	N 25 W	12.0	12.4	12.03	...	...	inap.
30	.637	.671	.793	.7062	19.4	20.2	14.0	17.37	6.73	69	97	68	92	84	72	76	N W b N	N W	N W	N 39 W	14.0	21.5	13.16	...	...	inap.
31	.823	.793	—	—	7.5	17.3	—	—	—	0.43	072	—	—	73	77	—	N b W	Calm.	Calm.	S 9 E	1.0	0.0	0.70	...	...	...
31	29.650	29.6478	29.7125	29.6753	29.00	33.35	28.47	30.03	5.23	138	141	129	134	83	71	74	—	—	—	—	6.21	10.40	5.91	...	...	4.0

REMARKS ON TORONTO METEOROLOGICAL REGISTER FOR JANUARY.

Highest Barometer..... 30.408 at 10 a. m., on 8th } Monthly range =
 Lowest Barometer 28.973 at 8 a. m., on 11th } 1.435
 { Maximum Temperature..... 47°.4 on p. m., on 26th } Monthly range =
 { Minimum Temperature..... 6°.5 on a. m., of 31st } 40.°9
 { Mean maximum Temperature 35°27 } Mean daily range =
 { Mean minimum Temperature 23°75 } 11.54
 { Greatest daily range 25°5 from a. m. to p. m. of 10th.
 { Least daily range 2°6 from p. m. of 28th to p. m. of 29th.
 Warmest day..... 26th ... Mean temperature..... 42.82 } Difference = 25°45.
 Coldest day..... 30th ... Mean temperature..... 17°37 }
 Maximum { Solar..... 59°.8 on 13th, } Monthly range =
 { Terrestrial..... 1.8 on 31st. } 58°0
 Aurora observed on 2 nights, viz. on 3rd and 8th.
 Possible to see Aurora on 17 nights; impossible on 14 nights.
 Snowing on 11 days,—depth 4.0 inches; duration of fall 45.2 hours.
 Raining on 6 days,—depth 1.152 inches; duration of fall 33.3 hours;
 Mean of cloudiness = 0.61.
 Most cloudy hour observed, 6 a. m., mean = 0.82; least cloudy hour observed,
 midnight, mean, = 0.47.
 Sums of the components of the Atmospheric Current, expressed in miles.
 North. South. East. West.
 1698.36 1304.19 2943.63
 Resulant direction N. 71° W.; Resulant Velocity 2.33 miles per hour.
 Mean velocity 7.40 miles per hour.
 Maximum velocity 29.3 miles from 4 to 5 p. m., on 30th.
 Most windy day 16th... Mean velocity 15.98 miles per hour.
 Least windy day 25th... Mean velocity 1.22 ditto.
 Most windy hour ... 2 to 3 p. m..... Mean velocity 10.59 ditto. } Difference
 Least windy hour ... 9 to 10 p. m..... Mean velocity 5.63 ditto. } 4.96 miles.
 2nd. Halo round the Moon at 6 a. m.
 3rd. Faint Auroral light in N. at 9 p. m.
 8th. Beautifully coloured Auroral patches and streamers, 6 to 8 p. m.
 10th. Solar Halo during the forenoon.
 23rd. Solar Halo at 11-30 a. m.
 25th. Dense Fog most of the day.
 29th. Well defined Lunar Halo and Parasena at 7.30 p. m.
 31st. Faint Lunar Halo at 6 a. m.

The mean Temperature of January 1858 was 6°45 above the average of 19 years, and is remarkable as having been the warmest January during that period.
 The fall of Rain and Snow were both in defect of the average, the first by 0.329 and the latter by 9.3 inches.
 The velocity of the wind was 0.14 miles per hour below the average of 11 years.
 Re: ulant direction and velocity of the Wind from 1848 to 1858 inclusive were N 72° W. and 2.73 miles.
 The month was therefore comparatively warm, dry, and calm.

COMPARATIVE TABLE FOR JANUARY.

Year.	TEMPERATURE.			RAIN.		SNOW.		WIND.	
	Min. Aver.	Max. from ob'd.	Range.	No. of days.	Inch's.	No. of days.	Inch's.	Resultant Direction.	Force or Velocity.
1840	17.0	-6.1	10.6	4	1.395	11	...	...	0.36 lbs.
1841	25.6	+2.1	11.7	2	2.150	14	...	...	0.78
1842	27.9	+4.1	15.8	5	2.170	9	...	...	0.69
1843	28.7	+5.1	14.4	6	4.295	12	14.2	...	0.70
1844	20.2	-3.9	14.6	7	3.005	11	24.9	...	0.55
1845	26.5	+2.1	13.0	5	imp.	10	22.7	...	1.09
1846	26.7	+3.1	11.2	5	2.335	9	6.0	...	...
1847	23.3	+5.1	11.5	7	2.135	5	7.5	...	...
1848	23.7	-0.1	6.3	7	2.245	8	7.1	N 82° W	2.03 5.82 mls.
1849	18.5	-5.1	10.1	4	1.175	10	9.2	N 63° W	3.76 6.71
1850	29.7	+6.1	16.3	5	1.250	8	5.2	N 37° W	0.69 5.80
1851	25.5	+1.1	13.2	4	1.275	5	7.8	S 77° W	3.26 7.65
1852	18.4	-5.1	17.3	0	0.0	19	30.9	N 68° W	3.14 7.67
1853	23.0	0.1	10.9	1	0.290	6	7.5	N 27° W	2.52 6.34
1854	23.6	0.1	15.2	7	1.270	11	7.6	N 78° W	2.31 6.86
1855	25.9	+2.1	18.2	5	6.525	13	23.3	N 80° W	1.86 7.67
1856	16.0	-7.1	13.1	0	0.0	11	13.6	N 70° W	5.24 10.69
1857	12.8	-10.1	14.6	3	imp.	16	21.8	N 70° W	4.96 10.31
1858	30.0	+6.5	15.8	6	1.152	11	4.0	N 71° W	2.33 7.40
M	23.58	...	13.16	4.4	1.451	10.9	13.32	...	7.54 mls.

MONTHLY METEOROLOGICAL REGISTER, ST. MARTIN, ISLE JESUS, CANADA EAST—DECEMBER, 1857.
(NINE MILES WEST OF MONTREAL.)

BY CHARLES SMALLWOOD, M. D., L. L. D.

Latitude—45 deg. 32 min. North. Longitude—73 deg. 36 min. West. Height above the Level of the Sea—118 feet.

Day	Therm. of the Air.			Tension of Vapor.			Humidity of Air.			Direction of Wind.			Velocity in miles per hour.			Mean direction of Wind.	Rain in Inches.	Snow in Inches.	WEATHER, &c.	
	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.				6 A.M.	2 P.M.
1	40.0	46.0	35.3	2.45	2.22	2.10	.92	86.00	SSE	WSW	WSW	7.92	5.00	10.00	...	0.160	...	Rain.	C. Str. 4.	
2	37.1	48.8	35.3	2.03	2.27	2.03	90.86	90.00	SSW	SSW	SSE	9.03	3.83	0.27	...	...	...	C. Str. 8.
3	42.3	48.4	33.0	1.89	1.60	1.20	89.86	82.00	W	WNW	WSW	16.13	6.03	23.36	0.50	...	...	Do. 10.
4	48.0	30.1	21.0	1.01	0.97	0.83	78.63	82.00	WNW	WNW	W	33.12	1.00	9.30	...	...	...	C. C. Str. 10.
5	43.0	30.1	6.5	2.00	1.51	0.83	64.67	87.63	NW	NNE	SE	1.63	0.93	1.63	...	...	...	Clear. Aur. Bore.
6	46.0	29.884	29.67	3.6	1.4	0.44	0.89	0.92	NE	NE	E	5.23	2.97	8.07	0.93	...	...	Do.
7	49.0	30.0	33.3	1.78	2.41	1.87	83.79	80.00	SW	WS	SW	16.21	10.17	11.23	...	...	...	C. Str. 10.
8	47.3	43.3	32.9	1.87	2.23	1.78	89.79	86.00	SW	WS	WS	4.51	3.02	3.36	...	...	...	Clear.
9	43.1	31.0	27.0	1.12	1.71	2.28	70.89	91.00	NE	NE	SE	7.63	8.51	6.51	0.240	...	...	Do.
10	37.0	37.5	23.0	2.10	2.07	1.06	90.84	73.00	SE	SW	SW	9.33	7.35	16.81	...	...	...	Clear.
11	39.0	30.0	12.3	0.2	0.63	0.68	67.67	77.00	NW	NW	W	23.33	8.72	10.51	...	...	...	C. C. Str. 4.
12	32.5	20.2	9.0	0.68	0.98	0.98	76.73	74.00	W	WS	WS	8.73	7.60	5.42	...	...	...	Clear.
13	18.7	29.914	29.818	34.6	1.23	2.14	187.84	85.00	WS	WS	WS	18.30	8.06	13.98	...	...	...	Do. Aur. Bor.
14	29.815	30.0	33.1	40.1	35.2	1.87	210.18	90.79	SS	SS	W	7.80	4.92	3.48	...	...	...	Rain.
15	30.188	30.260	18.5	19.1	24.1	20.2	0.91	0.89	NE	NE	NE	10.22	3.93	2.47	...	...	...	C. C. Str. 4.
16	48.2	18.4	19.6	31.1	24.7	0.91	152.135	73.78	NE	NE	NE	5.42	0.82	0.01	...	...	...	Light Cir. 2.
17	49.1	29.909	29.888	25.0	35.6	32.5	107.192	182.78	SE	SE	SE	1.00	0.01	0.01	...	...	...	Do.
18	45.0	33.0	32.2	34.4	34.0	1.91	203.205	90.94	NE	NE	NE	2.90	8.81	3.25	...	...	...	C. Str. 10.
19	41.0	30.0	22.5	18.8	12.0	1.02	103.073	80.78	W	W	W	12.73	14.30	15.77	...	...	...	Do. 10.
20	27.2	36.256	34.6	9.1	11.3	7.7	0.65	0.66	0.67	73.68	71.00	9.80	4.11	4.73	...	...	...	C. Str. 9.
21	19.9	100.29	33.7	7.4	30.5	17.0	0.51	1.45	0.96	87.78	83.00	2.30	1.05	2.31	...	...	...	Clear.
22	47.9	23.275	20.3	27.0	22.1	1.14	137.096	87.82	SE	SE	SE	7.42	6.46	9.10	...	...	...	C. Str. 8.
23	38.8	20.6	19.0	13.0	25.3	24.0	0.83	1.23	1.38	82.79	90.00	17.53	2.22	3.13	3.74	Snow.	
24	34.7	68.3	97.1	20.1	12.4	0.1	114.068	0.88	87.67	85.00	19.51	15.70	13.99	0.10	...	...	...	Do. 4.
25	30.0	90.8	85.1	10.7	8.2	0.4	0.22	0.45	0.34	78.68	74.00	0.21	0.00	0.00	...	...	...	Clear.
26	32.0	80.9	90.4	3.5	3.0	1.4	0.31	0.38	0.36	83.73	84.00	0.23	2.32	0.00	...	...	...	Do. 10.
27	30.0	30.188	30.002	13.0	7.2	3.0	0.18	0.40	0.31	74.70	83.00	0.36	0.03	0.22	...	...	...	C. Str. 8.
28	30.658	29.585	29.840	0.0	85.7	27.0	0.30	1.92	1.40	79.83	88.00	1.40	0.37	11.25	...	...	...	C. C. Str.
29	46.9	28.0	10.5	28.2	20.5	107.135	0.86	89.73	78.00	SE	SE	1.40	1.62	0.75	...	...	...	Do. 10.
30	30.0	68.0	63.6	12.5	26.0	28.0	0.70	1.29	1.41	73.80	83.00	0.31	2.06	3.15	...	...	...	C. Str. 10.
31	17.0	28.880	1.83	30.5	25.0	39.1	1.78	1.23	1.60	92.79	86.00	12.21	2.30	8.21	17.0	...	...	Snow.

A cloudy sky is represented by 10;
A cloudless sky by 0.

MONTHLY METEOROLOGICAL REGISTER, ST. MARTIN, ISLE JESUS, CANADA EAST—JANUARY, 1858.
(NINE MILES WEST OF MONTREAL.)

BY CHARLES SMALLWOOD, M. D., I.L.D.

Latitude—45 deg. 32 min. North. Longitude—78 deg. 36 min. West. Height above the Level of the Sea—118 feet.

Day	Barom. corrected and reduced to 32°			Temp. of the Air.			Tension of Vapor.			Humidity of Air.			Direction of Wind.			Velocity in miles per hour.			Mean direction of Wind.	Rain in Inches.	Snow in Inches.	A cloudy sky is represented by 10; A cloudless sky by 0.			W. EITHER, &c.			
	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.				6 A.M.	2 P.M.	10 P.M.		6 A.M.	2 P.M.	10 P.M.
	1	29.631	29.470	29.827	14.4	25.3	21.5	0.75	1.23	0.81	74	76	60	SSE	S	SW	17	83				0.08	3.72	C. Str. 10.	Snow.	10 P. M.
2	29.616	29.741	29.700	10.7	20.0	22.0	0.82	1.38	1.46	88	74	88	SWS	S	WS	5.57	0.78	14.50	...	...	...	Clear.	Do.	Clear.	
3	29.788	29.416	29.488	8.0	16.0	12.0	0.86	0.87	0.70	79	78	75	SWS	S	WS	4.00	0.23	12.53	...	...	...	Clear.	Do.	Clear.	
4	29.225	29.070	29.211	10.9	4.0	38.6	0.82	2.25	2.17	88	79	84	SWS	S	WS	2.00	12.82	30.62	...	...	...	Clear.	Do.	Clear.	
5	29.656	29.714	29.955	11.2	9.6	8.6	0.72	0.79	0.81	78	88	88	N	N	E	23.11	0.76	7.07	...	...	...	Clear.	Do.	Clear.	
6	29.947	29.852	29.816	6.0	2.8	2.6	0.69	0.47	0.44	81	84	84	N	N	E	17.85	12.22	17.40	...	...	...	Clear.	Do.	Clear.	
7	29.954	29.057	29.388	3.2	14.6	1.1	0.69	0.88	0.23	79	70	83	W	W	SW	13.72	4.00	5.70	...	...	...	Clear.	Do.	Clear.	
8	29.587	29.536	29.568	10.2	8.9	0.3	0.51	0.39	0.26	78	82	83	W	W	SW	9.25	3.06	4.73	...	...	...	Clear.	Do.	Clear.	
9	29.043	29.016	29.808	8.0	2.0	13.0	0.51	0.63	0.60	79	95	92	W	W	SW	2.73	1.82	1.45	...	...	...	Clear.	Do.	Clear.	
10	29.147	29.213	29.259	3.7	20.1	0.1	0.94	0.50	0.42	85	72	84	N	N	E	18.75	0.57	0.76	...	...	...	Clear.	Do.	Clear.	
11	29.387	29.357	29.356	28.0	40.3	39.5	1.03	2.15	2.26	88	92	92	S	S	E	20.65	10.87	10.12	...	...	...	Clear.	Do.	Clear.	
12	29.680	29.062	29.238	27.0	23.0	8.6	1.46	0.87	1.08	88	60	80	S	S	E	18.69	23.63	7.36	...	...	...	Clear.	Do.	Clear.	
13	29.065	29.912	29.948	4.2	24.0	18.0	0.31	1.00	0.87	79	74	81	E	N	S	3.60	7.46	3.63	...	...	...	Clear.	Do.	Clear.	
14	29.146	29.139	29.270	10.9	35.1	14.7	0.62	1.78	0.70	86	81	82	E	N	S	3.00	1.12	0.00	...	...	...	Clear.	Do.	Clear.	
15	29.292	29.151	29.034	4.7	13.9	15.0	0.43	0.70	0.74	75	82	81	E	N	S	5.03	10.65	6.61	...	...	...	Clear.	Do.	Clear.	
16	29.412	29.215	29.480	31.2	31.0	30.1	1.62	1.62	1.43	89	89	79	N	N	E	12.17	6.10	1.10	...	...	...	Clear.	Do.	Clear.	
17	29.766	29.728	29.944	10.1	14.6	4.2	0.57	0.70	0.16	89	82	84	N	N	E	16.03	9.07	4.57	...	...	...	Clear.	Do.	Clear.	
18	29.866	29.834	29.967	10.2	12.2	4.1	0.22	0.51	0.41	86	63	74	S	S	W	0.63	0.00	0.27	...	...	...	Clear.	Do.	Clear.	
19	29.018	29.936	29.987	9.2	13.2	2.2	0.54	0.97	0.42	78	80	85	S	S	W	0.92	0.05	0.00	...	...	...	Clear.	Do.	Clear.	
20	29.495	29.997	29.036	9.3	18.4	14.7	0.22	0.75	0.04	76	70	70	S	S	W	0.62	0.31	1.21	...	...	...	Clear.	Do.	Clear.	
21	29.432	29.890	29.100	16.6	37.1	19.8	0.20	1.12	0.54	75	82	71	S	S	W	8.88	15.43	10.33	...	...	...	Clear.	Do.	Clear.	
22	30.601	30.617	29.997	9.7	9.2	10.7	0.20	0.12	0.17	69	59	59	N	N	E	10.27	0.96	6.35	...	...	...	Clear.	Do.	Clear.	
23	29.675	29.555	29.403	18.7	1.0	5.5	0.13	0.30	0.24	69	69	61	N	N	E	0.52	0.02	7.11	...	...	...	Clear.	Do.	Clear.	
24	29.404	29.510	29.313	9.0	22.4	14.0	0.24	0.84	0.69	74	71	65	N	N	E	0.60	0.10	0.00	...	...	...	Clear.	Do.	Clear.	
25	29.154	29.057	29.055	21.4	40.0	33.2	0.89	2.12	1.75	72	82	81	N	N	E	0.62	0.11	1.17	...	...	...	Clear.	Do.	Clear.	
26	29.703	29.614	29.503	34.6	43.2	37.1	1.83	2.62	2.00	90	84	96	S	S	E	0.05	1.77	9.36	...	...	...	Clear.	Do.	Clear.	
27	29.570	29.614	29.751	32.4	38.7	21.5	1.69	2.12	1.12	81	82	92	S	S	E	12.63	12.07	8.57	...	...	...	Clear.	Do.	Clear.	
28	29.745	29.709	29.755	19.0	19.9	15.3	0.90	0.84	0.70	78	71	70	N	N	E	11.65	16.50	8.02	...	...	...	Clear.	Do.	Clear.	
29	29.801	29.654	29.703	13.4	22.0	18.6	0.67	0.98	0.62	81	74	90	N	N	E	21.28	9.40	5.35	...	...	...	Clear.	Do.	Clear.	
30	29.645	29.571	29.766	18.0	21.9	6.4	0.81	0.82	0.82	77	62	64	N	N	E	9.30	10.75	22.31	...	...	...	Clear.	Do.	Clear.	
31	29.917	29.533	29.080	10.1	5.0	4.4	0.17	0.31	0.29	57	56	82	N	N	E	23.12	10.20	5.93	...	...	...	Clear.	Do.	Clear.	

REMARKS ON THE ST. MARTIN, ISLE JESUS, METEOROLOGICAL REGISTER
FOR DECEMBER.

Barometer.....	{	Highest, the 20th day.....	30.346
		Lowest, the 31st	28.880
		Monthly Mean.....	29.743
		Monthly Range	1.466
Thermometer...	{	Highest, the 1st day	43° 0
		Lowest, the 27th day.....	-13° 2
		Monthly Mean.....	14° 98
		Monthly Range	59° 2

Greatest intensity of the Sun's Rays..... 59° 0

Lowest point of Terrestrial Radiation -13.5

Mean of Humidity800

Rain fell on 5 days amounting to 1.350 inches; it was raining 32 hours 30 minutes.

Snow fell on ten days, amounting to 26.81 inches; it was snowing 68 hours 50 minutes.

The most prevalent wind was N. E. by E.

The least prevalent wind E.

The most windy day the 24th; mean miles per hour 16.40.

Least windy day the 25th; mean miles per hour 0.00.

Aurora Borealis visible on 3 nights.

Lunar Halo on 2 nights.

The electrical state of the Atmosphere has indicated moderate intensity.

Ozone was in rather large quantity.

REMARKS ON THE ST. MARTIN, ISLE JESUS, METEOROLOGICAL REGISTER
FOR JANUARY.

Barometer	{	Highest the 22nd day	30.697
		Lowest the 4th day.....	29.070
		Monthly Mean.....	29.907
		Monthly Range	1.627
Thermometer	{	Highest the 26th day	43° 4
		Lowest the 23rd day	-15° 7
		Monthly Mean.....	13° 76
		Monthly Range	62° 1

Greatest Intensity of the Sun's Rays 31° 0

Lowest Point of Terrestrial Radiation -19° 2

Mean of Humidity..... .786

Rain fell on 5 days, amounting to 0.751 inches; it was raining 34 hours and 40 minutes.

Snow fell on 7 days, amounting to 11.78 inches. It was snowing 34 hours and 35 min.

Most prevalent wind, N. E. by E. Least prevalent wind, E.

Most windy day, the 12th day; mean miles per hour, 16.36.

Least windy day, the 18th; mean miles per hour, 0.10.

Aurora Borealis visible on 5 nights.

Zodiacal Light very bright.

Parhelia and Mock Suns visible on 2 days.

The Electrical state of the atmosphere has indicated moderate intensity.

Ozone was in rather large quantity.